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Editor: Douglas G. Woolf

A Big Order in Knit Goods

THE knitting industry, whose origin is lost in the mist of unrecorded history according to a writer in this issue, continues to make new history.

The "confusion" which we recorded as reigning at the Philadelphia show two years ago, has increased rather than abated. At times this confusion may even seem to resemble chaos but a more judicial view would depict it as a healthy state of unrest in an industry whose current undertone is a dynamic one.

The most casual examination of the articles in this issue—in which we have attempted to highlight and evaluate the outstanding trends in knitting—cannot fail to uncover this restlessness.

▼

Mesh hosiery accounts for 40% or more of the sales in full-fashioned . . . . Even though a warning is sounded against overconfidence in the permanence of the novelty boom, it is admitted that women's fancy hosiery is here for an extended stay and that "the mill which styles its hose correctly is likely to be busy for some time" . . . . The mesh vogue has technical ramifications, such as the necessity for thorough degumming in dyeing silk hosiery . . . . When fashion set its stamp of approval on mesh effects in women's apparel, the demand throughout the knitted outerwear market was stimulated.

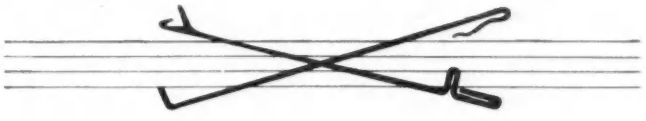
Excessive weighting and stretching of circular-knitted rayon fabrics sets off a market-wide controversy and results in sharp decrease in sales of rayon undergarments—with its effects felt seriously in the primary yarn market . . . . Knitting of full-fashioned hosiery on one machine apparently still in experimental stage . . . . A patent pool formed with the announced intention and ability to control production of women's non-run hosiery . . . . A knitting machine manufacturer develops a plan for stabilizing the market through regulating the output of certain patented machines . . . . Novel labor experiment in full-fashioned industry being watched by industrialists within and without the textile field . . . . Lack of uniformity in silk currently imported presents a problem.

Buying of bathing suits more backward than in any year since advent of sun-suit but style emphasis proving effective way of offsetting general hesitancy . . . . Swiss-rib fabrics return to popularity in women's underwear . . . . Need of styling evident in men's half-hose . . . . Constructive leadership being asserted by associations in the industry.

▼

These are only a few trends, isolated at random. If they point to any one problem in particular, it is that of style—at once the hope and the menace of the knit goods industry. It offers manufacturers a merchandising weapon; it leads them on into excesses born of over-confidence. The answer is given by one man quoted in this issue: Move cautiously in production—and promote actively, with particular emphasis on the smarter styles.

That's a big order. It calls for big men: not necessarily men who control great units but men who have enough vision to capitalize on style, combined with enough restraint to refrain from cheapening quality in the service of style.



Philadelphia Ready For Opening of Knit Goods Week

SEVERAL aspects combine to lend particular significance this year to the observance of Knit Goods Week, which opens in Philadelphia on Monday, April 11. The Knitting Arts Exhibition begins on that date at 2 p.m. at the Commercial Museum, continuing daily, 10 a.m. to 10 p.m., until the close at 5 p.m., Friday, April 15. The Knit Goods Show will mark its 28th birthday; during that extended period, the show has become a tradition, having gathered to itself through a continuity of successful displays, a deep and permanent significance in the mechanics of the textile industry. Just before this article went to press, the National Association of Hosiery and Underwear Manufacturers, under the auspices of which the exhibition is held, announced that 90% of the space occupied at last year's show had been engaged; so it is safe to assume that the 1932 event will come close to equalling that of 1931 in scope, and will certainly equal it in importance.

Considering the difficulties of the current year, this is a substantial gain. Textile machinery manufacturers are exerting particular effort to make their showings representative of developments in equipment during the year. One factor which lends unusual significance to the exhibition is the fact that it will have less competition in the form of other textile events during Knit Goods Week in Philadelphia.

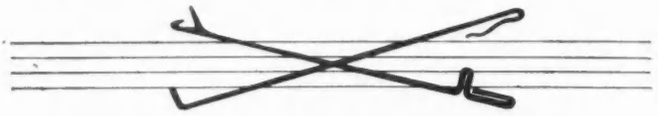
This fact will permit visitors to concentrate their attention more fully on the exhibition, and should make for a better response, as regards interest, contacts, and orders to be placed at the booths. With the keen interest in economy already widespread and with the new movement for quality now being launched, equipment which meets these needs should win quick approval at Philadelphia. The showing will be replete with new and vitally important displays, which are described more fully elsewhere in this issue.

The twenty-eighth annual convention of the National Association of Hosiery and Underwear Manufacturers will be held Thursday, April 14, in the lecture hall of the Commercial Museum. The meeting will be called to order at 11 a.m. and the program provides for a short single session; a new departure is that the officers of the association will be the only formal speakers. William Meyer, president of the association and president of the Apex Hosiery Co., Philadelphia, will deliver his annual address, analyzing the conditions of the industry; and Ernest Blood, of John Blood & Co., Inc., treasurer, will offer his financial report.

Especial interest centers on the address to be delivered by Earl Constantine, recently appointed managing director of the association, succeeding John Nash McCullaugh, who resigned after a decade of service, to become general manager of Berkshire Knitting Mills. Mr. Constantine will give a short talk, and has chosen as his subject, "Making Port in the Storm." As this will be Mr. Constantine's first formal appearance at an annual convention of the association, the occasion will give many members their first opportunity to meet him. The program also provides for the election of officers.

Immediately following the convention, the hosiery association will hold its annual luncheon, which is scheduled for 1 p.m., also at the Museum. Serious matters will be forgotten at this affair, and the feature will be a whimsical talk by Count Ernest Russo, of Milan, Italy, on "America as I Find It"; a musical program of interest will be offered by a Philadelphia orchestra. Reservations for the luncheon should be made with Chester I. Campbell, general manager of the exhibition.

In view of the numerous complaints made by hosiery mills regarding the quality of raw silk delivered recently, the hosiery association, is making tentative plans for a conference on the subject of "Two-Tone Silk," to be held in conjunction with the Knit Goods Show.



KNIT GOODS WEEK
In Philadelphia

Monday, April 11. Opening of Knitting Arts Exhibition, Commercial Museum, 2 p.m.; directors' meeting, National Association of Hosiery and Underwear Manufacturers, Manufacturers' Club.

Tuesday, April 12. Exhibition at Museum, 10 a.m. to 10 p.m.

Wednesday, April 13. Exhibition at Museum, 10 a.m. to 10 p.m. Meeting nominating committee, Hosiery Association; place of meeting not decided.

Thursday, April 14. Exhibition at Museum; annual convention of National Association of Hosiery and Underwear Manufacturers, lecture hall, Museum, 11 a.m. Speakers: William Meyer, Ernest Blood, and Earl Constantine. Election of new officers. Annual luncheon of association at 1 p.m.; speaker: Count Ernesto Russo, of Milan, on "America as I Find It."

Friday, April 15. Exhibition closes at 5 p.m.

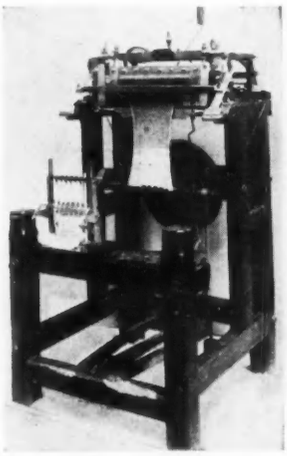
GUIDE
To Knitting Arts Exhibition

✦ Alphabetical list of exhibitors with their booth numbers and a floor plan of the Commercial Museum, Philadelphia, are given in this issue beginning on page 78. This material constitutes a guide to the show.

Following the name of each exhibitor is given in brief the items which his exhibit features and the names of the company representatives in attendance at each booth.

In TEXTILE WORLD of April 16 will be published a survey of the technical developments at the show and reports of the various trade conventions held in Philadelphia during the week.

Knitting History *in a Bird's-Eye View*



An early knitting frame

ENTRY into the textile field of the principle of knitting is shrouded in the mists of unrecorded history. It is not known what people first produced fabrics by the interlocking of loops. It may have been practiced in the very early ages, but according to histories the first mention of the art is in an act of the English Parliament about the year 1488. Perfection of power-driven machines to do what was originally done by hand is of comparatively recent date, although hand-operated machines had their birth about 1589 in the invention of a knitting frame by William Lee of Calverton near Nottingham, England.

Although different histories vary as to details, it seems that Lee, inspired by seeing a woman knit by hand, devised a frame which would do the same thing mechanically. This frame involved the use of spring-beard needles with suitably actuated sinkers, the principle of which is credited to Lee as a wholly original invention, and which has never since been fundamentaliy changed. It is said that by skillful hand-knitting 100 loops may be formed per minute. Lee's first machine, which had eight needles to the inch, was said to make 600 loops per minute, and his second machine, with twenty needles to the inch was said to make 1,200 loops per minute.

Lee's frame knit a flat fabric which was later made into a stocking by joining the selvages. Aston, one of Lee's co-workers, improved the operation of the frame by placing a fixed sinker between every two movable jack sinkers, but Lee was so far ahead of his time that until about 1745 no further improvements were recorded. At that time was introduced the tuck-presser, which permitted two or three loops to be accumulated on the same needle. As an outgrowth of this, Jedediah Strutt in 1758 invented the Derby rib hosiery frame. By using a set of needles at right angles to the row on the Lee frame, Strutt was able to reverse alternate loops, thus forming a ribbed fabric. This material clung more closely to the leg and at the time became more popular for hosiery than the former flat fabric. This was important for it must be remembered that men dressed in knee breeches and hose until early in the 19th century. Warp knitting dates from the invention of a warp-knitting machine by Crane of Edmonton, England in 1775. In 1799 William Green devised an improved jack machine, for producing all kinds of open-work knitted fabrics. In 1812 there were nearly 30,000 hand frames in Great Britain alone. In 1830 the first circular seamless knitting machine was invented in England by Sir Mart I. Brunel of Nottingham, but little was done with this machine then. Invention of the latch needle, first practical alteration of Lee's original bearded needle, is credited to Matthew Townsend of Leicester, England in 1847.

The first vertical movable needle bar, rotary-cam frame was brought out by McCullum and Woodward around 1862 which was later developed by William Cotton in 1864 in machinery for the production of full-fashioned plain and fancy hosiery and underwear which made his name famous in the knitting industry.

In the United States, although knitting had been a home industry centering in Germantown, Pa., from early times, there was little original mechanical development until after the middle of the 19th century. The Germantown home industry is said to be turning out 600,000 pairs annually by 1759. Just when hand machines come into the picture is uncertain, but it is generally understood that in 1825 what was perhaps the first collection of knitting frames under one roof to which the name "knitting mill" might be applied was established by Thomas R. Fisher, in Fisher's Hollow, near Philadelphia. It was in operation until 1857 when it was forced to close through financial reverses. John Button who came to the United States from Leicestershire, England, in 1830 is credited with being the first to use a power drive for his knitting frame. He erected a mill in Germantown in 1835. Timothy Bailey of Albany, N. Y., used power on a knitting frame in 1831 and Egbert Egberts assisted by Bailey did the same thing in Cohoes in 1832.

In 1818 a number of knitters from Nottingham, England, settled at Ipswich, Mass., and finally in 1822 they smuggled a machine out of England and began work in a private dwelling. In 1824 the first hosiery mill was erected in Ipswich, which competes with Fisher's Hollow for the first such mill in the United States. It later grew into the Ipswich Mills, which were prominent in the hosiery industry for many years. Thus the industry had its beginning only about 100 years ago.

In 1865 there appeared the first knitting machine built and marketed in the United States. It was called the "American Machine," a circular machine operated with a hand crank, three turns of which were necessary to produce one round of knitted fabric. The first knitting machine of which there is record in the Patent Office was designed by Dana Bickford of Boston, who obtained a patent on Sept. 10, 1867, for a circular machine. A second machine designed by Bickford used latch needles, and it is understood that this was the first machine capable of producing goods whether it was run forward or backward. I. W. Lamb in 1869 invented a flat knitting machine which made a stocking more nearly complete than any other machine at the time.

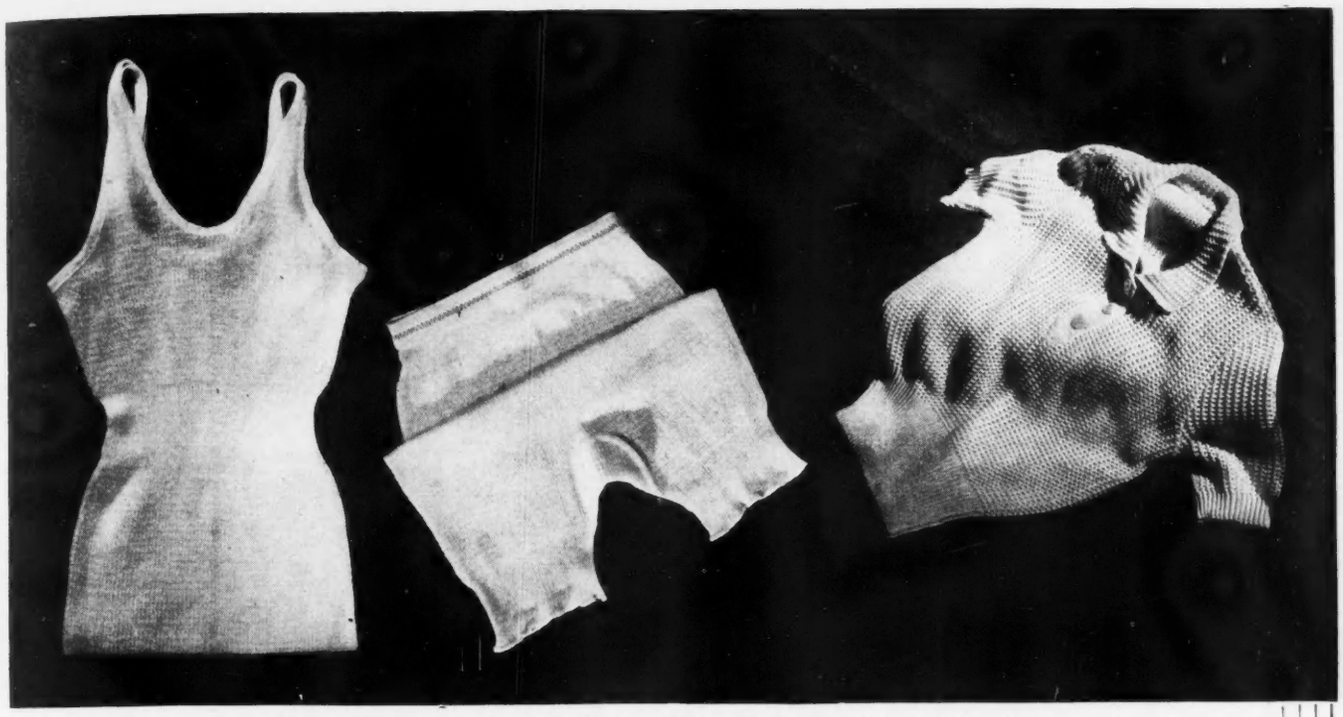
In 1880 the first seamless power machine for use in mills was put on the market by J. L. Branson of Philadelphia who had previously made a circular machine for family work. In 1883 the automatic rib frame and rib top machine were brought on the market. Joseph Higginbottom and J. L. Branson both brought out machines of slightly different types in this same year. In 1890 Branson brought out the semi-automatic footer.

▶ Formal lace stocking with geometric figuring by Lehigh Silk Hosiery Mills. ▶ Cotton V-neck sweater and cotton puff-sleeve sweater by Branford Sportswear, Inc.† ▶ Mercerized cotton pom-pom hat and scarf with appliqued teddy-bear design for children's wear by Sanitary Knitting Mills.*

New Style Developments

▶ Distinctive street dress of mercerized cotton and wool Lombardi Knitcraft fabric by M. J. Kane Co.* ▶ Mesh hosiery of pendant design (right) by Propper Silk Hosiery Mills Inc. ▶ White cotton anklets for juniors with gaily colored tops. Children's anklets of mesh cotton lisle by Hub Hosiery Mills.†

*Courtesy Durene Association.



▶ At left, cotton vest and next to it cotton panties knit in combination of fancy stitches designed to give attractiveness and elasticity by Van Raalte Co.† ▶ Hand-knit design sport sweater of Du Pont spun rayon by D. Nusbaum & Co.

in Knit Goods

▶ Mesh cotton gloves by Fownes Brothers & Co.† ▶ Silk half-hose of conservative mesh by Phoenix Hosiery Co. ▶ Handbags of mercerized cotton mesh by Virginia Art Goods.* ▶ Knit terry-cloth pajamas, blue body with yellow-trimmed sleeves by Henry Hadad Co.† ▶ Form-fitting athletic undergarment of Du Pont rayon by Munsingwear Co.

†*Courtesy Cotton-Textile Institute*

Industry's Spokesmen Urge Cooperation

Earl Constantine

Roy A. Cheney

Harold R. Lhowe

Merchandising, the Prime Hosiery Problem

By Earl Constantine

Managing Director, National Association of Hosiery & Underwear Manufacturers

THE problems of the hosiery and underwear industries today relate mainly to merchandising. The last two years have served to trim operating and manufacturing expenses, and to improve management efficiency.

We can never hope to escape the operations of the law of supply and demand, and under it we are dealing today with a buyer's market. In such market the anxiety of management to continue operations, maintain personnel, and utilize equipment, as well as the occasional need to liquefy assets and meet obligations, lead to quotations which allow little if any margin of profit. The wise manufacturer will bear in mind that being and remaining in business require that the price received shall exceed the price of production and merchandising, and give a margin of profit. No business can long survive a policy which overlooks this fact.

In part, our two industries are suffering from general adverse conditions, but to a great extent they are paying the penalty for lax or bad policies and practices which they have permitted to develop within the industries. We must correct such policies and practices not only for the purpose of returning to profitable business, but likewise in order that we may establish general respect for us. Obviously, the task calls for concerted effort, and the instrument for this is to be found in our organization, which is maintained by the industries, and which is fitted to do the task. With the cooperation of our manufacturers much can be accomplished. There is growing and encouraging evidence that the manufacturers are disposed to work out these common problems together, and to accept the leadership and the assistance which it is our responsibility to furnish.

◆

Knit Underwear Industry Cuts Distribution Costs

By Roy A. Cheney

Secretary, Associated Knit Underwear Manufacturers of America

FOUR of the outstanding problems which face industry, whether organized or not are these: The reduction of government expenses, which includes the reduction of taxes; the reduction of the cost of distribution which includes a study of such costs; a rebirth of faith in the intrinsic and final value of quality; and the development and dissemination of facts as to prices and policies of competitors so that a market based on the true economic situation rather than based on rumors, lies and fears may be established and maintained.

Every one realizes that cost of government must be radically reduced, not only to rejuvenate business but to

prove to industry and to the people that the government is willing to share in the reduced incomes which all have suffered. In this matter, which includes the reduction of taxes, the primary duty of the association is to search out the facts, place them before the industry and render vocal to those in political power the needs, wishes and rights of the industry.

The costs of distribution must also be materially reduced because today there is an unwarranted and too heavy burden placed upon the pocketbook of the consumer in getting merchandise from the mill or factory to him. This is true, wherever the fault lies, whether it be with the manufacturer, the wholesaler or the retail merchant. These costs can be reduced and in the knit underwear industry are being reduced by an intelligent, careful study of the facts, and through the enlightened cooperation of competitors based not upon what each one thinks is so but upon unassailable facts carefully gathered.

Every industry is suffering and has been suffering from the substitution of price for quality. When I write "every industry" I include within industry the factors of distribution as well as those concerned solely with the manufacturing and selling of goods to the wholesale or retail market. All have suffered and all have suffered equally, but I am of the opinion that we have just about reached the turn. The cry for prices on the part of the buyer plus the fear of competitive prices on the part of the manufacturer have reduced the quality of a great many lines of merchandise now offered to the point of absurdity.

When this point arrives, and I believe it has arrived, the swing back the other way begins. The National Retail Dry Goods Association has taken the leadership in this fight for quality as it has taken leadership in so many other constructive measures. This association, by itself and in cooperation with other industries, and with the splendid help of the organized traveling salesmen, also has been bringing to the attention of all concerned the need of quality for satisfaction and profit to all concerned, viz., manufacturer, wholesaler, retailer and consumer.

The textile industry is overburdened with a love of gossip and a naive belief in the wildest stories, particularly if they have to do with a reduction of price or the granting of concessions to the buyer. The sad part of it is that the buyer himself does not want these lower prices nor the concessions, but looking back at the history of the textile industry, the buyer acts as any other sane man would, viz., to place himself in as good a position as his competitive buyer. These is nothing illegal in the gathering and dissemination of facts to the members of an organization, nor in intelligent action by these members upon the basis of facts presented to them.

The law is becoming more intelligent and the men who administer the law are becoming more learned in the facts of business and more closely in touch with the economic needs of industry. I believe that we are on the verge of a strong line of decisions, clarifying and broadening and making applicable to modern conditions the legal principles and theories which were all right a generation or two ago but which now are as outmoded as a high wheel bicycle or side whiskers.

◆

Cooperation Keynote Aim of Knit Outerwear Group

By Harold R. Lhowe

Executive Director and Counsel, National Knitted Outerwear Association

IT IS my brief purpose here to indicate specifically a few of the practical problems confronting the knitted outerwear industry, problems which the National Knitted Outerwears Association is attempting to solve.

We believe that the knitted outerwear field has greater potentiality for expansion at the present time than perhaps any other branch of the textile industry and the guide in that development must be the trade association. Knitted fabrics present advantages not possessed by the woven fabrics. Their low cost, their ease of production, the comfort and snugness provided by their elasticity, and their chicness, make them highly desirable.

Though every manufacturer in the industry will definitely benefit by this expansion, only men of broad understanding can be expected to take the lead. It is hoped that others will join as the work proceeds. Our great problem now is to bring the specific needs of the industry to the attention of its members so that their cooperation will be practical and effective.

There is, first of all, the great and urgent need of the industry to make known to the nation's legislators the problems of this important branch of the American textile trade. In a representative government the lack of sufficient unity of a group to sound a single voice in the country's legislative chambers is equivalent to a total lack of representation by that group. Few knit goods manufacturers may realize the value of a tariff at the moment, but their appreciation of its value would become suddenly acute and even tragic if that protection were removed.

The National Knitted Outerwear Association is also working toward the solution of problems which may be classified as internal. These are many and varied. The cost of distribution to manufacturers, for example, has been a mounting item of expense to be reckoned with. This problem, aggravated by evils that have cropped up in the wholesale trade, will account to no small extent for the fact that despite the brisk and steady demand for knitted garments by the general public, the business complaints of knit goods manufacturers have been brisk and steady.

In the wholesale trade the situation has been badly complicated by the lack of volume buying by the jobber, and the necessity of the manufacturer to sell in volume if he is to give the jobber a favorable price differential. The net result of these conditions has been, in many cases, that the manufacturer has gone into competition with his customer (jobber) in attempting to sell to the retail trade. Such a situation might very well be remedied, if only the proper cooperation could be invoked.

Then again, the element of style in knitted outerwear constitutes a problem in itself for the industry. Of course, no exponent of the trade association—no matter how ardent—can or should hope to standardize style. That element of variability and changing fancy is most desirable. But certain malpractices such as style piracy should be exterminated. Uniform opening dates, standardization of colors, enforced trade practice rules—in such cooperative actions lies the solution of many problems.

In speeches at conventions, banquets, committee meetings, there is no more widely touted word than "cooperation." The value of concerted action is everywhere loudly acclaimed; but, it is as sad as it is true to relate, that in many cases the word is hollow and meaningless because of its lack of practical consequences.

In our day, as Professor John Dewey epigrammed it, rugged individualism has become "ragged" individualism, and cooperative harmony is the order of the day; and there is no business man of understanding, I suppose, who would dare answer no to the question: "Do you favor cooperation in your industry?" But few have a true appreciation of what the practical needs of cooperation actually are. To extend that sense of effective harmony is the great objective of the National Knitted Outerwear Association.

Overconfidence Seen as Danger in Hectic Output of Mesh Hosiery

By John Black
Assistant Editor, TEXTILE WORLD

MESH hosiery is here to stay; mesh hosiery is only an over-night proposition—a passing fancy. A few more months and women's staple hosiery will be out of the picture; mesh hosiery will never supplant staples.

You may take your choice of these conflicting opinions. The whole typifies the confusion in the minds of full-fashioned hosiery manufacturers regarding the outlook for the most significant style development the hosiery industry has seen in several years, namely the mesh and lace boom. Consumer demand for these novelties has grown so sensationally during spring that manufacturers have increased their output to almost hysterical proportions. There is no clear opinion regarding the outlook; every one has a different view. With regard to output, however, capacity production seems to be a safe policy at the moment; demand is more than equal to supply.

But overconfidence breeds danger, and it is imperative that the novelty hosiery boom be viewed with detachment. An analysis of its background will give us a basis on which to estimate its future. At present hosiery manufacturers are all too indifferent about the future; many are building stocks and planning schedules on the assumption that the current hectic call for mesh stockings will continue indefinitely.

Mesh hosiery sales in retail stores have grown month by month almost without a break since last fall. Today this line is established as a major branch of the hosiery department. Manufacturers' salesmen coming in from the road see mesh as important in high-priced hosiery for the next six months. Retailers believe mesh will continue popular so long as staples remain a bargain counter proposition. One prospect which grows more likely each day, is that there will be no sudden return to staples; that the more conservative of the mesh numbers will gradually become a staple line, with pattern growing less and less important, until it is practically eliminated.

Current trends in mesh styles appear to substantiate this view. The best-selling numbers by the leading manufacturers of mesh hosiery are conservative in design. Small uniform patterns are preferred. They must be smart and distinctive but they must also be subdued. Another element to be considered is that mesh cannot in any sense be viewed as a faddist line. The normal mesh hosiery market, while subordinate, is legitimate and permanent. Mesh hosiery, at its best, is both artistic and practical. It must be kept in mind that, whatever happens to the present boom, mesh will always have its own individual discriminating public.

Today, however, mesh is in the volume class. It is estimated that 40% of current full-fashioned hosiery orders call for mesh as against staples. By the time this article is published, staples and meshes may be running neck-and-neck. The New York sales manager of a leading hosiery company expects mesh to become 60% of their business during the summer, if the bare-leg fad does not prove a serious competitor. This company now is a month behind in deliveries of its mesh hosiery lines and is at capacity output.

Increased demand for mesh during the warm weather would be logical, as this stocking is normally a summertime proposition; it shows at its best with summer apparel. Manufacturers are busy developing their plans for summer shades and designs, and some of these lines are already on the market. Prospects point to sun-tan mesh hosiery as a big line for the vacation period. White will be seen, but only in a few parts of the country; the big emphasis will be on tan shades, from nude to the deeper beige tones.

An interesting feature of the novelty market is that the life of individual designs has lengthened. Conspicuous wide-spaced mesh are now practically obsolete in the higher-priced range; small net effects continue popular, and certain numbers in the latter group have sold steadily since last fall. One foremost knitter of mesh hosiery does almost his entire business on two numbers; this is in contrast to last winter, when buyers would reject a mesh stocking as passé though it had only been out six weeks.

Will mesh hosiery finally break the staples market? Manufacturers answer this question with a variety of opinions. The more conservative are apt to say no, but even in this group, there is uncertainty. One authoritative viewpoint follows: Mesh hosiery is selling well now and will be fine all summer, but more mills are entering this business every day and there is a possibility of overproduction. Keen manufacturers should watch carefully for signs of price weakening. Mesh is only moderately competitive with staples in the higher brackets; it is unlikely that prices of the better grades will weaken. However, the cut and sewn mesh, now selling at $1.00 and less represents a danger. Indeed, even here any successful competition with staples is unlikely; it is more probable that the low-priced mesh itself will suffer, as a mesh stocking of inferior manufacture is less satisfactory than a staple number in the same price range.

Sewn Mesh Popular

Demand for cut and sewn mesh shot up sharply during the last two months. At first, price was not stressed unduly, the most popular lines being those made to retail at $1.25; there is still a good demand for this range, but there is also a growing call for $1.00 numbers. Available stocks are moderate and prices are firm. As most of the companies now entering mesh production are going into the low-priced lines, output should regis-

ter a decisive rise during the next eight weeks. Competition promises to be keen in this division.

While increasing competition is in view for all mesh lines, there is a limit to the number of mills which can go into quality mesh production, since special equipment is required, and mills are averse to additional investment at this time. Mechanical problems in sewn mesh hosiery output are less, which naturally suggests big increase in output there.

Even as we write, however, the picture changes; hosiery machine manufacturers this month report a big rise in demand for quick delivery of mesh attachments. It is indicated that mills are making strenuous financial effort to equip themselves to meet the new vogue; the average cost of re-equipping full-fashioned machines to make mesh hosiery is $1,200 and all knitters who can possibly do so are making the necessary changes in machinery. Incidentally, the boom has materially helped the hosiery machinery industry during what otherwise would be a very hesitant year.

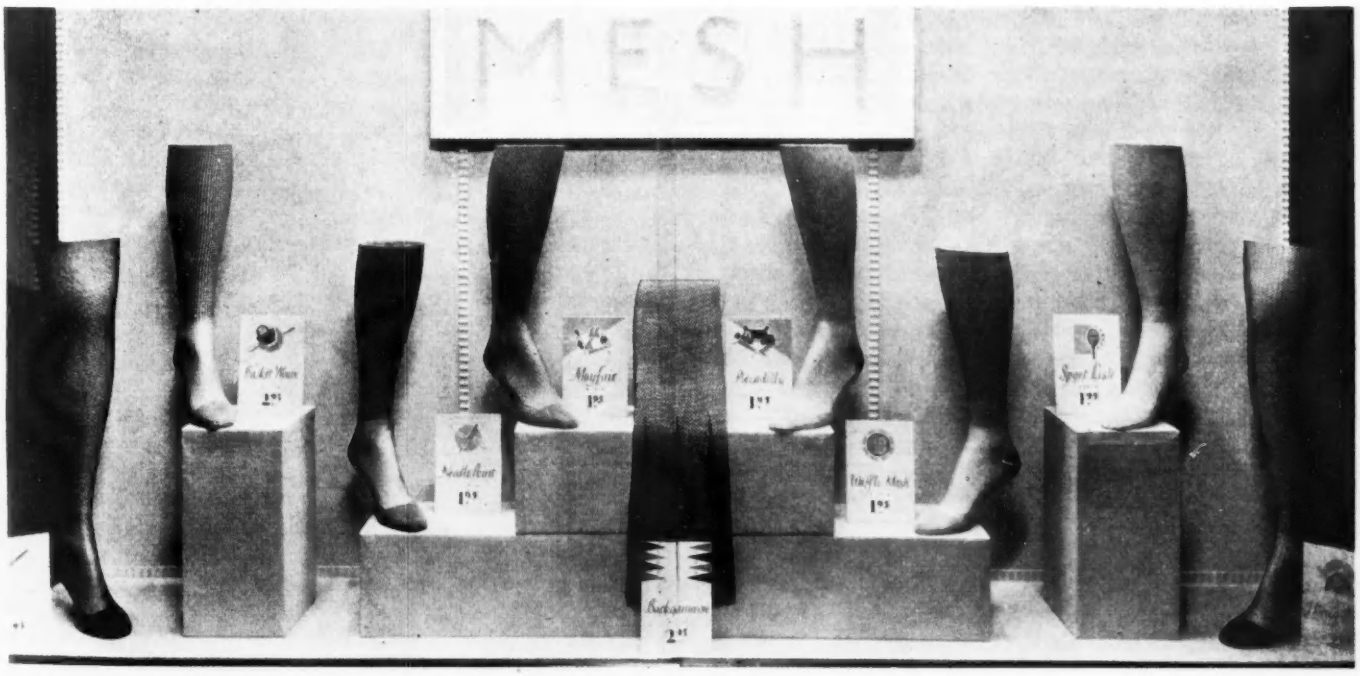
When lace hosiery and lace-tops and other novelty lines are included in the general designation "mesh," there is no question but that the group offers a real challenge to the supremacy of staples, both as regards volume and profits. Numerous mills which make staples and mesh are simply trading dollars on the former, relying on the latter for their entire profits. The firm tone of mesh hosiery prices and the adequate margin allowed manufacturers make them eager to go into this line to the maximum of their resources. Quality mesh selling today at retail for from $1.35 to $2.95 were stated by a foremost designer of mesh hosiery to be "an excellent money-maker, affording mills the best per unit profit they have had in some years."

Retailers also are enthusiastic about mesh, and their sales of this line are rising so fast as to suggest that the summer may find staple full-fashioned in a very subordinate position. The following figures show the comparative position of mesh and staples in retail sales during December: of three leading American department stores, one reported mesh sales to be 41% of total hosiery turnover, another put the figure at 38% and still another at 39%. Since December is normally the weakest month for mesh hosiery sales, this may be regarded as the low, with mesh percentage rising monthly thereafter.

As a postscript to the preceding we will interpret some significant trends, which became manifest just before this article went to press. During the last days of March, several New York stores that are acknowledged style and quality leaders, advertised mesh hosiery at $1.00 per pair. As these retailers were out of the sewn hosiery class, the merchandise was presumably full-fashioned, which indicated a decided drop from the previous accepted figure of $1.35, as a low for good quality full-fashioned mesh. The reduction does not necessarily forecast an early depression of mesh hosiery prices, but it has significance. Some of the leading medium-price stores enjoyed an active post-Easter volume on cut-and-sewn mesh numbers which retailed at between 90c and $1.00.

This narrowing of the price differential between certain grades of novelties and plain full-fashioned may continue, but it is not likely to have any immediate effect on the better qualities of mesh and lace stockings. The safest road for the manufacturer to follow is to concentrate on two main points: care in manufacture, and originality and distinction in design. Nowhere in the whole range of hosiery is finesse in manufacture so vital as in these novelties, and the consumer can be relied upon to respond to this appeal. The approaching summer offers almost unlimited opportunities for variations that lend themselves to summer shades.

With merchandise of high quality and up-to-the-minute in design, the mesh hosiery manufacturer is empowered to stand by his guns as regards prices. The next few months will unquestionably see price pressure, but the manufacturer has it largely in his own hands, to decide whether he shall be stampeded into slashing or not. With profits generally so meager, it is inevitable that the hosiery trade, both manufacturer and distributor, should rush headlong into a field where quick and handsome profits are promised. The cue is to watch stocks, hold firm on prices,—and drop mesh immediately on the first real signs of a waning demand.



Good promotion has aided vogue of mesh hosiery.

Thorough Degumming Essential in

Dyeing Silk Mesh Hosiery

By Noel D. White

DYEING and finishing of silk mesh hosiery is conducted in practically the same manner as for other types of silk stockings, but particular care must be exercised to obtain good penetration of the dyestuff in the knots and seams. This is especially true of cut hosiery which is made from flat-knitted materials. The seam in the back and the one which unites the foot to the leg are particularly difficult to penetrate. Therefore the hosiery must be thoroughly degummed, or the subsequent dyeing will be disfigured by streaks, harsh places, and other defects.

Large mesh hosiery tailored to fashion

Three methods are employed for dyeing mesh hosiery: (1) the one-bath process in which degumming and dyeing are carried out simultaneously; (2) the two-bath method, in which the stockings first are degummed and then dyed in a second soap solution; and (3) the two-bath method in which the goods first are degummed and rinsed, and then are dyed in a glauber-salt bath, with or without an addition of acetic acid. The method of dyeing is best left to the judgment of the dyer. The writer's preference is to dye in a fresh bath using glauber salt and acetic acid. In this way, if the stockings subsequent to dyeing are treated to give a dull finish (and the demand now is for delustered hosiery), there is less danger of streakiness.

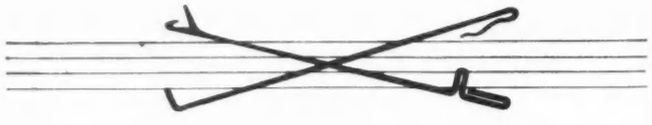
In boiling off, sufficient soap should be used to complete degumming in 30 to 40 min. If soft water is available, 15 to 18% of soap is usually adequate. An addition of 2% of soda ash, or its equivalent of another mild alkali, is often advisable to emulsify completely all lubricants and to assist in removing the sericin. Rinsing of the material after degumming must be carried out carefully so that the degumming agents will remain in an emulsified condition until they are completely removed; otherwise they may break down, impregnate the goods with greasy pellets, and cause the production of spotted hosiery. Improper rinsing usually results from the use of water which is too hot or which contains calcium, magnesium, or iron salts.

To prevent chafing of the fabric and to facilitate handling, mesh hosiery, as a rule, is processed in nets or muslin bags. When the hosiery has been degummed, and is to be dyed in a separate bath, it is hydro-extracted to remove the excess water, and carefully disentangled to straighten out any stockings which may have become knotted during the degumming operation. It is now replaced in the same bags, or put in bags of the shade to be dyed, and loaded in the dyeing machine. Care should be taken not to overload the machine with the mistaken idea of speeding up production. Plenty of room must be allowed for the goods to circulate freely through the dyeing bath, or uneven work will result.

Direct colors are used largely for dyeing mesh hosiery and must be carefully selected from those which exhaust slowly. Glauber salt, sodium phosphate, acid, or any chemical which is added to the bath to complete the exhaustion of the bath must be entered in several portions. Seams of the stockings may be sewn with silk, but in most cases cotton is used. Although that is the only cotton in the hosiery, it must be dyed to match the silk, or an unsightly effect is obtained. In order to insure a good union and brighten the shade, it is often necessary to add acid- or neutral-dyeing colors. A small amount of a good dyeing assistant is often employed to promote even dyeing and aid penetration.

Mesh hosiery is delustered and finished like other types of silk stockings. If the goods are dyed in a clean acid bath, delustering may be carried out at the same time. If, on the other hand, they are dyed in a soap or glauber salt and oil bath, delustering must be made a separate operation. In the latter event the hosiery is rinsed well; run for 15 min. in the delustering solution; the necessary amount of sizing or finishing materials is added; run another 15 min., extracted lightly, and boarded without delay.

As a rule, 3% of the delustering agent will prove sufficient. In some cases, however, a high degree of dullness is required and a larger amount of the chemical must be employed. When this is true, after delustering is complete, the bath should be dropped, the goods rinsed, and finishing done in a fresh bath with just enough water in the machine to cover the goods. The hosiery is worked in this solution until well impregnated, and then is extracted and boarded in the usual manner.



Minimizing Loop Distortion in Knitting Full-Fashioned Mesh

By M. C. Miller, M. E.

◆ *In this article Mr. Miller outlines the various methods employed for knitting mesh fabric on full-fashioned hosiery machines and tells where certain important adjustments must be made with great care and accuracy. Since the narrowing mechanism plays such an important part in the production of mesh, readers interested in this type of hosiery are urged to consult Mr. Miller's series of articles on narrowing the full-fashioned stocking now running in* TEXTILE WORLD *at intervals of a few weeks.*

MESH fabric lends itself to a great variety of patterns and designs. Its production is old in the art, as are the mechanisms with which it is more or less automatically made on present Cotton full-fashioned hosiery machines. All such fabrics produced on these machines are the result of loop transference by means of points very similar in shape to the regular narrowing points that are used on plain-fabric machines.

The difference between a Petinet point for mesh (in Germany mesh fabric is known as Petinet) and a narrowing point is that the former, due to its usually being used over only every other needle, can be somewhat wider than the latter. The loop-lifting points used for narrowing loops inwardly for fashioning purposes cover a group of adjoining needles and are therefore strictly limited as to width. The use of a wide point for loop transference is a distinct advantage, as the needles can be located by the points more readily and with greater certainty. The limit of point width must not exceed space between knock-over bits, plus a few thousandths.

As a majority of the machines in this country have been recently equipped with picot attachments to meet the demand for this type of hosiery, it was only a natural evolution that brought about the all-over Petinet, which can in the simpler designs be produced with picot attachments. Market demands for Petinet, however, are not new in the industry. The period prior to this one occurred about 25 years ago. The demand usually runs for three or four years, and thereafter mesh or so-called lace hosiery has practically no sale.

Picot attachments for knitting mesh are especially arranged to give considerable latitude to the degree of loop shift and the number of times a varied shift can be made before repeating the pattern. These fabrics might well be called picot Petinet, as they are produced with the picot bar, possibly adding a versatile shift control.

Another type of Petinet is produced by one or more single points engaging with any desired number of loops in any one course and shifting them any desired distance through the use of a special single or double Petinet-point attachment. With this attachment, if the pattern calls for 40 loops to be shifted in one course and there are, let us say, two points being used, it requires twenty movements of the narrowing machine to transpose that particular course before knitting can continue. With this attachment, if it has range enough, an endless variety of patterns can be made—at the expense of production.

There is still another attachment that can be used, which will produce any type of Petinet fabric without the great loss of production just noted. This attachment is known as the jacquard Petinet. It can be attached to a plain machine but, due to its intricate nature, is very difficult to apply. The jacquard Petinet machines are usually produced, therefore, with the mechanism built into them. This type of Petinet machine is fitted with a point for every one or two needles. At each transposed course the jacquard mechanism selects the points which the pattern dictates are to be in action at the next loop-shifting operation, so that with one narrowing motion the desired number of loops are transferred.

As previously noted, all Petinet effects are produced by points movable with the narrowing machine, the regular narrowing points being racked out of the way beyond the edges of the widest fabric that is to be knitted. The stocking, as a rule, is shaped by merely arresting the traverse of the carriers, so that the resultant stocking blank is produced with raw, non-selvage edges, although some attachments have been built that permit the use of the regular selvage narrowings.

The regular narrowing machine, as we know, must be set quite accurately in relation to the needle movement even for plain fabric. However, as the majority of defective work occurs at the needles that later receive double loops and as in Petinet work a far greater number of needles receive such double loops, it follows that unless great care is exercised in setting the narrowing machine for Petinet, much defective fabric may result.

This is clearly seen by examining Fig. 1, which shows a section of plain narrowed fabric lifted off the needles. It will be seen that only at the area *A* has loop twisting and confusion taken place, whereas with even plain picot shift fabric, as shown in Fig. 4, this loop confusion has taken place at every other needle.

Another point to note is that in the plain narrowed fabric, as shown in Fig. 1, the thread *a* is readily lengthened as the points lift away from the needles, by robbing its yarn from the two needles 1 and 2, while Fig. 3 plainly shows that in ordinary alternate-point picot Petinet, this extra length of *a* yarn can only be as much longer as half the loop formed by the needle 2, as the adjoining point *a* yarn robs the other half of the loop from this needle. This limited yarn robbing makes it difficult, upon later side shifting, as shown in Fig. 4, to prevent the pulling out of alignment of the needles 2, 4, 6, and 8,

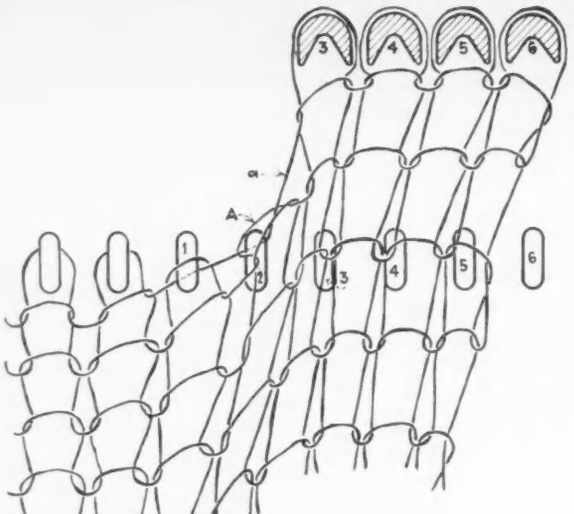


Fig. 1. Regular selvage narrowing

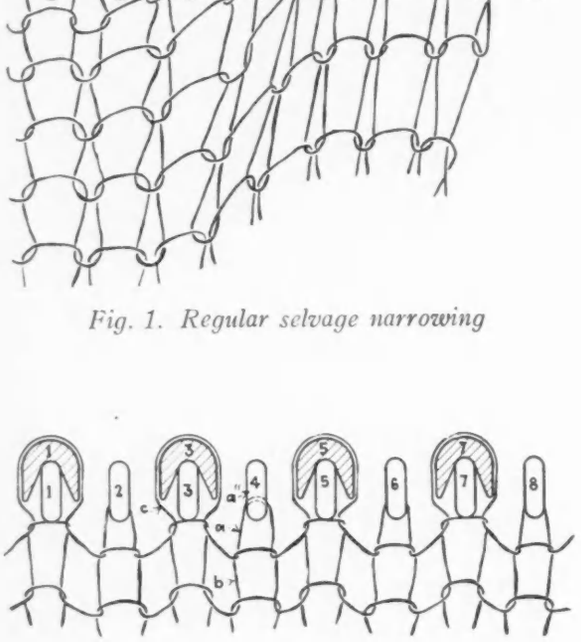


Fig. 2. Points engaging alternate needles

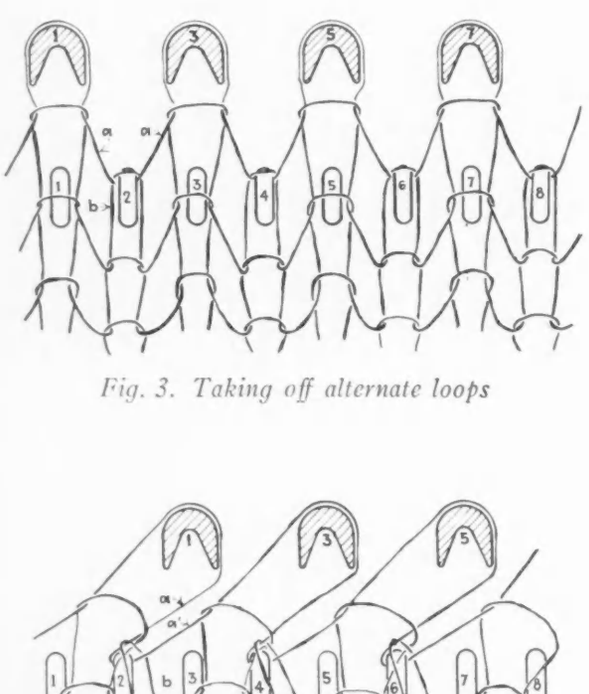


Fig. 3. Taking off alternate loops

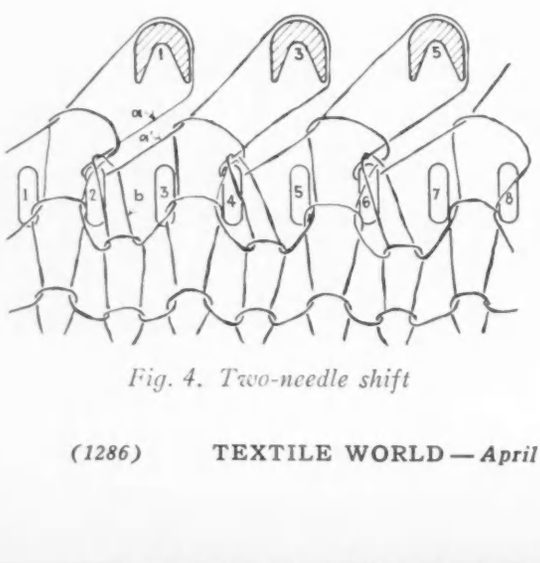


Fig. 4. Two-needle shift

and the points 1, 3, and 5. Such misalignment of the points will of course affect the repositioning of the needles and points when the transfer operation has reached the position shown in Fig. 5; but as long as the side shifting is limited to, let us say, two indexes (as shown), no particular difficulty with later point-and-needle registry should result, unless the knitting is too tight. Figs. 2, 3, 4, and 5 show an alternate-point picot Petinet loop arrangement. In Fig. 2 the needles, fabric, and points are seen at the first engagement of the points with the needles, prior to the loop-removal operation. In Fig. 3 the loops are removed from the needles 1, 3, 5, and 7 and are held by the 1, 3, 5, and 7 points respectively. In Fig. 4 the points have been shifted two indexes to the right, prior to the re-engagement of the points with the needles and the subsequent transfer of the loops 1, 3, and 5 on the points to the needles 3, 5, and 7. Fig. 5 shows the re-engagement of the points 1, 3, and 5 with their respective needles 3, 5, and 7.

It will be noted that the loops *a* of the needles 2, 4, 6, and 8 (Fig. 2) have been entirely eliminated as loops by the points moving away from the needles, as shown in Fig. 3. These loops, when the transfer operation has reached the position shown in Fig. 4, are merely bars of yarn, marked *a* and *a'* respectively. In Figs. 4 and 5, they are still in the form of bars of yarn *a* and *a'*; and the loops of the previous course *b*, which were properly attached in Fig. 2 to the *a* loops, take the form of the peculiar loop *b* shown in Figs. 4 and 5. It will be seen that the loop head *a''* (Fig. 2) does not at all resemble a proper loop in Fig. 5, in which position it is pulled sideways with one end of the loop in the hook of the needle and the other end over the hook of the needle. Yet upon subsequent upward movement of the needles, a portion of the yarn of this loop head marked *a''* (Fig. 5) must roll to the back of the needle, as shown by the arrow on the needle 2. The bar of yarn *c* (Fig. 2) must also in Fig. 5 fall to the back of the rising needles.

It is at this Fig. 5 period of the transfer that imperfect fabric is produced, as shown by Fig. 6, in which the *a''* yarn may be seen somewhat forward in its relation to the needle hook. Upon subsequent upward movement of the needles, this loop would fall off the needle on its beard side, instead of moving toward the back of the needle and remaining on the needle shank. In Fig. 6 the needle 2 is shown bent back slightly; although a somewhat slack loop *a''* will, even when needles are in line with each other, cause this defect. Fig. 7 shows the resultant fabric produced after the movements of the loops shown in Figs. 2, 3, 4, and 5.

In the production of any pattern there is a tendency to disalign the needles and points as the fabric is shifted, as shown in Fig. 4, this being particularly true when the loops are to be shifted more than two indexes. In the latter case the set-up shown in Fig. 8 is desirable. This arrangement uses only half the number of points, but requires double transferring. By using this method, adjoining points can rob yarn from three needles and thereby get a longer length of *a* yarn (Fig. 8). With this length of yarn, a serious disalignment of the needles or points upon later loop shifting will be prevented. Whether or not this system can be used depends entirely upon the pattern, but in many cases wide-shift fabric can be produced with this method.

In an article of this length, it is not possible to show any variety of fabrics, the purpose being merely to make clear to those skilled in the art the loop disturbance and distortion that takes place and to bring to the attention

of those responsible for the setting of the knitting and narrowing machine the greater care which must be exercised in such setting when producing Petinet fabrics as compared with plain shaped fabrics. In this regard, I shall enumerate the more important machine settings.

I would suggest that, in order to set the narrowing machine properly, each end needle be broken off exactly at the line *a*, Fig. 9; that is, just where the full depth of the eye ends, prior to its running out. This will permit the narrowing machine to be set up and down accurately at each end of the needle bed. Care should be exercised to see that the narrowing machine is so set that the end of the points comes to, or very nearly to, this line *a*.

In so far as the in-and-out setting of the narrowing machine is concerned, carefully observe that, upon the second engagement of the points with the needles—that is, when the loops are being returned to the needles—, sufficient press is given to insure that the points are fully buried in the needle eyes without over-pressing. If over-pressing is resorted to, the needle hook will be forced out of the point, as shown in dotted lines *c* in Fig. 10. This will of course cause trouble when the loops are in the Fig. 5 position; for, if any needle hook is out of its point even slightly, the bars of yarn *a* and *a'* opposite such needle might well fall to the beard side of the needle and cause a pinching of the yarn, as shown in Fig. 11. This would result in either the cutting of such a loop or loops or the dropping of them. It is quite obvious that a tensioning of the fabric in the direction of the arrow (Fig. 5) will assist materially in rolling loop *a''* to the back of its needle and will also assist in pulling away the bars of yarn *a* and *a'* from the back of the rising hooks.

In order to assist in the reforming of the yarn *a* and *a'* into a loop just prior to the transferring of the loops back to the needles, while the needles and points are in the dotted *D* position shown in Fig. 10, and prior to their position as shown in Fig. 5, it is highly desirable that the distance *b*, as shown in Fig. 10, be as great as possible. This is in order that the loops held on the needles 2, 4, 6, and 8 (Fig. 5) may be reformed prior to the coming up of the needles. This reforming should take place at the time the needles are in their dotted *D* position shown in Fig. 10, and the loops should be held so reformed until they are entirely buried inside their respective points, as also shown in this figure.

If, as is usual, the movement of the needle hook from the dotted *D* position (Fig. 10) is in the direction of the arrow, there is a likelihood of the bars of yarn *a* and *a'* (Fig. 5) falling to the beard side of the needle prior to the full press of the needle into its respective point. If the movement of the needles toward the point from the dotted *D* position to the fully buried position (Fig. 10) is at about right angles to the points, they can be fully buried before the upward movement of the points and needles takes place, in this manner assuring that the bars of yarn *a* and *a'* will fall to the back of the needle and that the loops of the needles 2, 4, 6, and 8 will with greater certainty be properly reformed.

As it is very difficult to know whether the needles are down as far as possible between the knock-over bits, it is suggested that the machine be set for the tightest stitch that it is intended to knit while producing Petinet and that a number of dummy narrowing movements be made with the fabric on the needles—without, however, lifting any loops. Continue to adjust the needles downwardly until cutting results, and then set them up slightly, being thereby assured that the needles are going down as far as the loop lengths will permit without cutting.

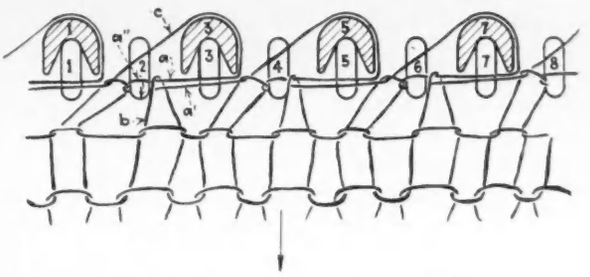
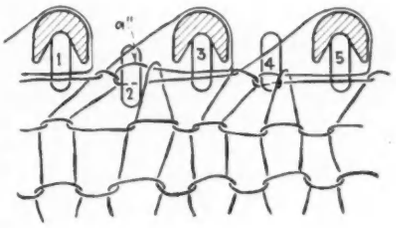


Fig. 5. Loops returned to needles



Yarn picking
Fig. 11.

Fig. 6. Needle 2 out of line

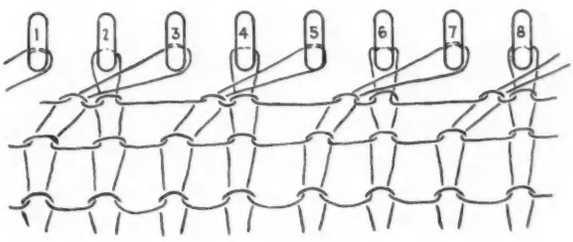


Fig. 7. Completion of alternate needle picot transfer

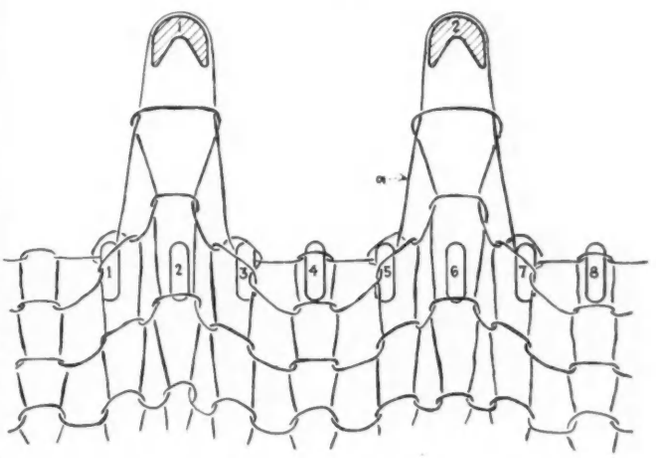


Fig. 8. Point for every fourth needle

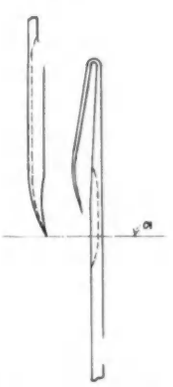


Fig. 9. Up-and-down setting of point and needle

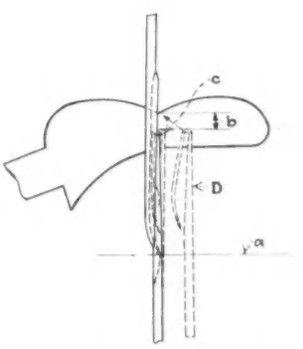


Fig. 10. Second narrowing press setting

Mesh and Lace Circular Hosiery

Presents Few Technical Difficulties

By L. J. Hill

◆*"Women's fancy hosiery is here for an extended stay," says the author of this article, "and the mill which styles its hose correctly is likely to be busy for some time to come." Mr. Hill discusses the technical details involved in the manufacture of mesh and lace hosiery on the machines with which he is broadly experienced.*

THE production of lace and mesh hosiery on circular machines is not difficult, if the machines have been properly set up for this work. The initial change to make on a spiral machine is, where possible, to equip it with special, offset, short-taper, forward-hook needles. This type of needle can be adapted to many circular machines. A characteristic is the hook, which leans forward much farther than the regular forward-hook needle, thus allowing the float or face yarn to be placed easily far enough down behind the needle without the necessity for much tension being applied to it. This greatly minimizes the possibility of any flat or unfloated stitches being formed when the needles are leveled at the stitch cam. It is very essential that the needles be kept in line; if they are not, streaks of flat knitting are sure to be produced.

Causes for Misfloats

Another cause of misfloats lies in the needles being sometimes floated too high; i.e., in the hooks being too close to those of the needles that are catching both yarns. The hooks of the lower or float needles should be located about $\frac{1}{8}$ in. below those of the needles that are catching both the back and facing yarns.

Raising and lowering the float finger to feed the yarn properly over the hook is largely a matter of experimentation. Late-model machines, however, are being equipped with an adjusting screw for raising and lowering this finger, and this greatly facilitates the process. If the lower hooks are too high on just a few of the machines, the chances are that the needle-guard cam or the cylinder pattern-jack cam has been ground off by some fixer in solving a previous problem.

Determining Size of Mesh

The mesh is made by switching the float needles, and the size is determined by the number of courses knitted before the needles are switched. Tension also plays an important part in determining the size of the mesh, light tension producing a larger mesh than heavy tension. Furthermore, it is important that the facing yarn be larger than the backing yarn. This gives a raised effect on the mesh and presents a much better appearance; it also adds strength and elasticity to the hose.

Unless a larger facing yarn is used, the mesh will have the appearance of flat rings between the floats, and this will become more prominent as the stitch is made tighter for the ankle and foot. Finer yarns and tighter stitches will reduce this ring effect, and alternating the float courses oftener will bring the mesh eyelet or hole closer together. The latter, however, will reduce the size of the mesh.

The size of yarn to be used is largely determined by the gauge of the machine and the number of needles, but it is not difficult for anyone familiar with the machine to arrive at a decision as to what size to use. The finer the gauge, the more difficult to float unless the special forward-hook needle is used. This needle makes floating easy where it might be very difficult on fine-gauge machines. Rough-surface or high-twist yarns are more difficult to float than ordinary-twist or smooth-surface yarns, and where high twist is used it is better to have left twist in the face yarn, especially if good plating is desired. Unless high twist is used, however, regular, or right-twist, yarns knit satisfactorily.

Seaming Circular Hose

Seaming mesh hose made on circular machines can best be accomplished by floating two needles all the way from the welt to the heel and knitting about two wales flat on each side of the two float needles. The panel serves as a guide for the seaming operator, and the two float wales will allow the fabric to bend or fold down easily, facilitating the efforts of the operator to secure a straight seam. The panel will be practically hidden in the sewing of the seam. Another benefit to be derived through the knitting of this panel is that it will allow the selector on the knitting machine to change pattern jacks without causing any misfloats or throw-offs where the change is made. As the butts are clipped off from these pattern jacks, the selector is allowed time enough to be in position for the change of pattern and the selectors are in toward the cylinder far enough to press the first float jack, which will insure perfect floating on every course right up to the panel.

As a rule, mesh hosiery made on the proper machine is easily manufactured and is finished in the same way as plain hose of the same yarn. Although special lace designs sometimes bring up different problems from those encountered in plain mesh hose, the difference is slight; and those skilled in the art do not find the problem difficult to solve.

Wide Field for Fancies

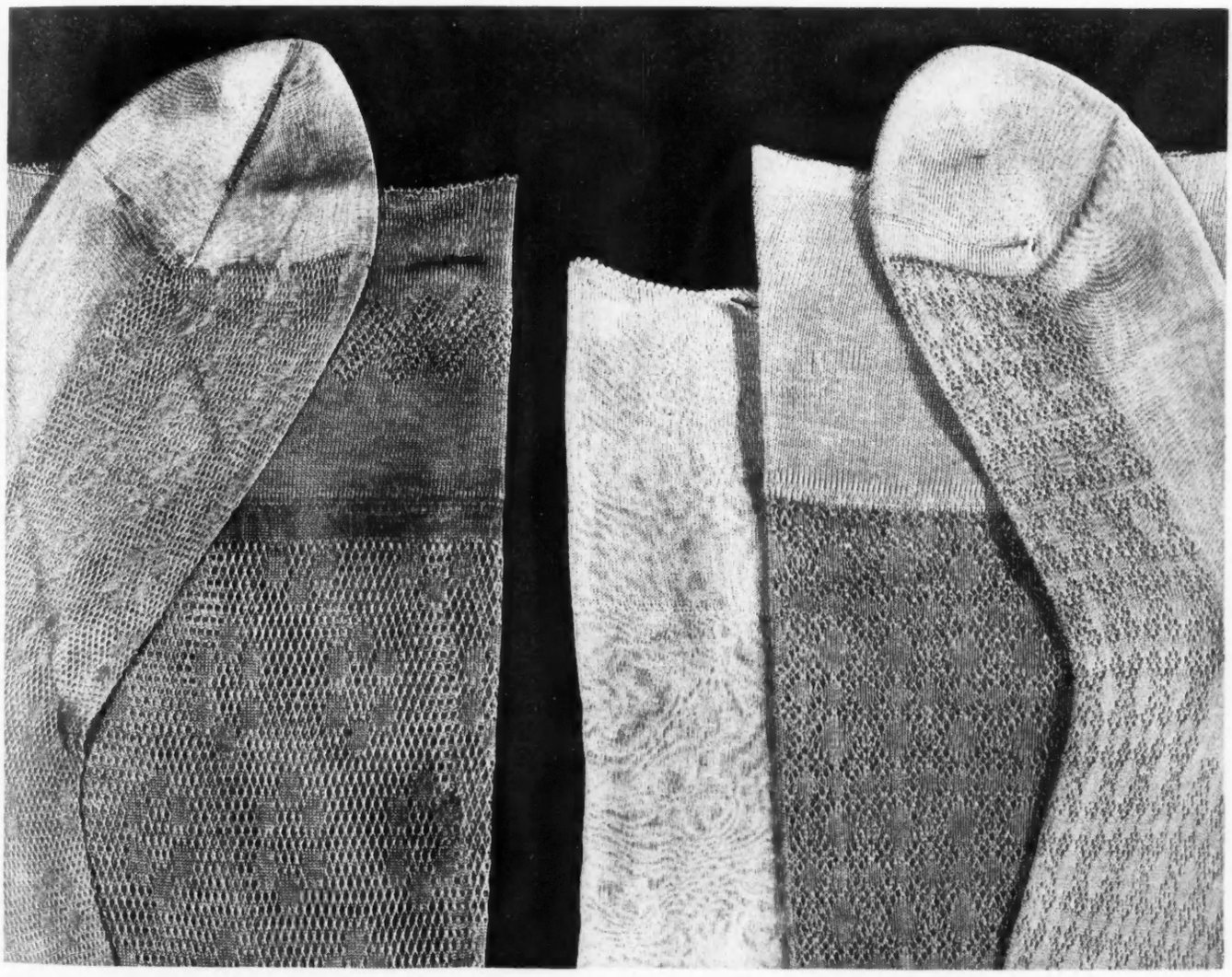
Original designing of mesh and lace hosiery has been attributed to a comparatively small group. One mill's product will suggest something a little different to another, and after a little experimentation a very attractive hose will be evolved. The machine is so designed that there is practically no end to the variety of patterns and designs that can be constructed on it. Lace and mesh hosiery have given the alert manufacturer ample food for thought, and it appears that these styles are just the forerunners of a large and varied group of fancy hose.

The present outlook for mills equipped to make these fancy designs in women's hose is, therefore, comparatively bright.

Not many years ago the number of different colors used in women's hose was quite limited. A wave of style appeal was injected into hosiery in the form of colors, and manufacturers enjoyed an increased consumer demand.

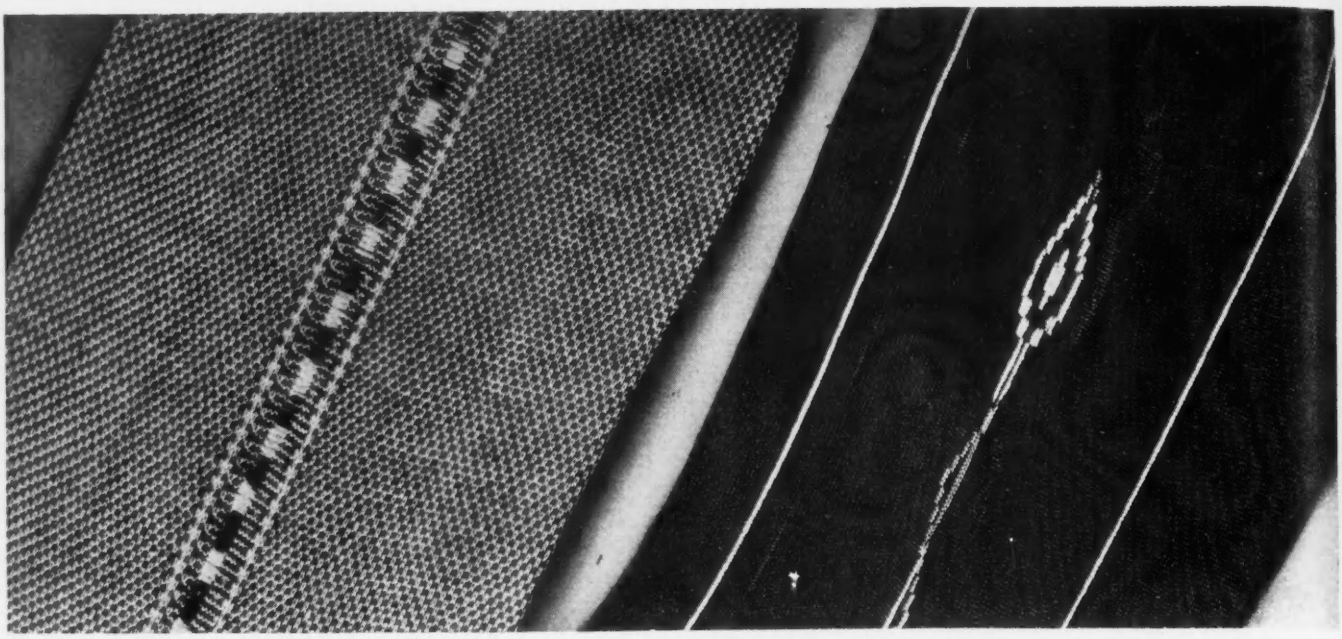
The modern circular machine of today offers the same opportunity that colors did a few years ago. Women's fancy hosiery is here for an extended stay, and the mill which styles its hose correctly is likely to be busy for some time to come. The present demand for new styles of hosiery for women is growing. Fancy patterns are growing in popularity with men, and the demand for men's fancies is increasing in much the same manner as the demand increased for the new colors in women's hose.

It is entirely possible that with proper styling, women will take to new designs as long as they *are* new; and the modern circular machine offers the manufacturer an unlimited field in this direction.



Women's circular-knit lace stocking, provided with gusset toe and fancy lace-effect welt

Misses' circular-knit lace hose; in background, a plain-stitch circular hose with new single top which is now applicable to lace hose



So-called mesh half hose, in which the effect depends largely upon the use of silk threads of contrasting colors

Red, white, and green clock with vertical white stripes produced on black silk background by means of the wrap stitch

Mesh Joins the Wrap

in Men's Half Hose

By Franz E. Baker

◆ *Clocks, needle wraps, meshes, garter tops, full-fashioned men's hose, anklets, transferring, and looping are among the topics discussed by Mr. Baker in the accompanying article.* TEXTILE WORLD *has in store for coming issues a number of technical articles which will take up some of these subjects in greater detail.*

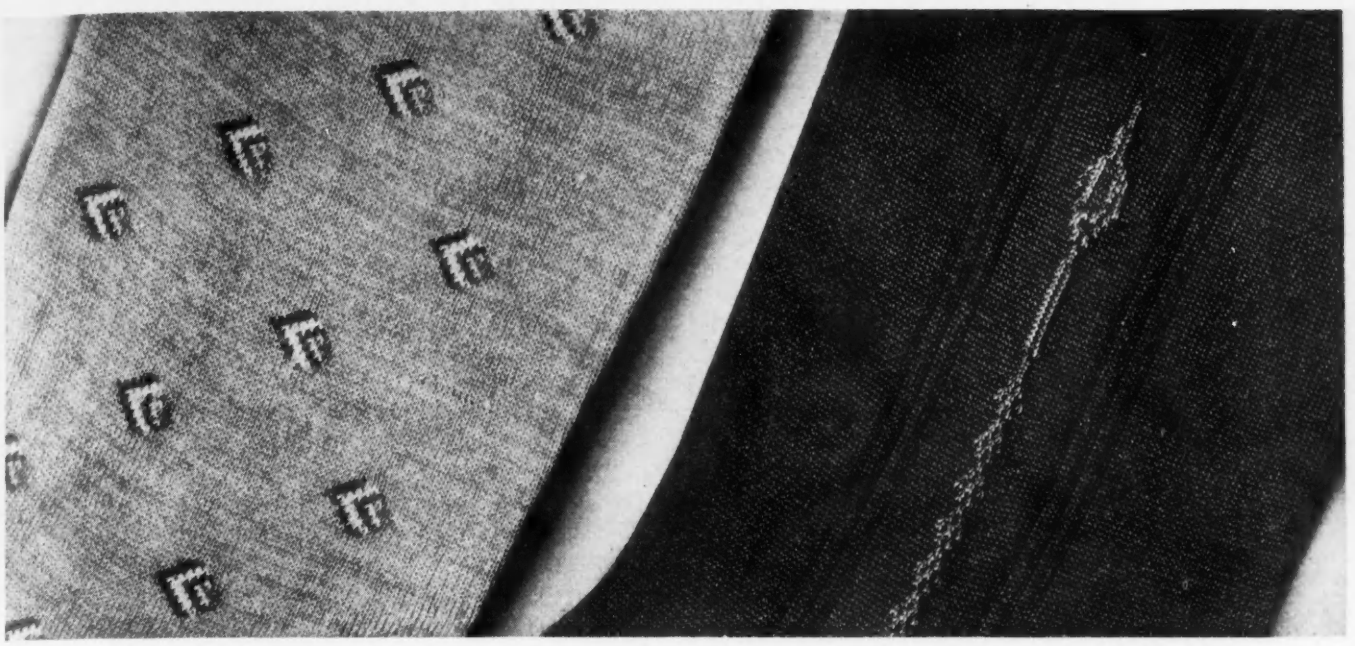
NECESSITY is the mother of invention. One might easily substitute for "necessity" the word "depression" and not change the veracity of the saying a great deal. The truth of the statement is especially apparent in the hosiery trade today. Never have such strides been made in the development of new half-hose designs and designing attachments as has been the case in recent years.

There was a time when, if a man could dye a good fast black and a cordovan brown with now and then a gray or blue, he was a hosiery dyer. Then again, if a man could keep a hosiery machine in repair and put in needles when they broke, he was classed as a fixer. But now all is different. Not satisfied with driving the hosiery dyers frantic with multitudes of shades with fancy names, they have turned upon the machine manufacturers and fixers for new stitches and designs.

The public eye seldom has turned from women's full hose long enough to criticize the masculine half hose. It seems, however, that mere man is being egged on to buy half hose with multi-colored clocks, multi-colored stripes, and meshes. Also, and in some respects paradoxically, the flash of the half hose of several years ago has been subdued. Pastel shades are in vogue, colors heretofore heard of only in feminine attire.

Clocks on men's half hose are not a recent innovation. They were popular several years ago. At that time they were put on by sewing machine, by hand, or by floating vertical stripes. The latter method leaves loose threads inside the hose which offer hazards for masculine toes. The clocks put on by sewing machines and by hand make the half hose more expensive. For these reasons, the clock met with disfavor and dropped out almost entirely.

Recently, however, there have been introduced, machines which insert vertical stripes and clocks by small fingers which wrap a separate yarn around individual needles. These wrap-stripe machines, so-called, make a clock which has no floats. The interior of the stocking is left free of loose ends and floats. The mechanical detail of these machines is rather intricate and delicate, but it is surprising with what speed and precision intri-



Worsted half hose with green, white, and dark-brown wrap-stitch figures on light-brown background

Vertical "lace-stitch" stripes in combination with light-blue wrap-stripe clock on dark-blue silk background

cate patterns can be inserted in a short time. Each finger feeds one yarn to one needle. There may be as many fingers as needles, if desired. The needle to be wrapped rises to a high level and the finger wraps its yarn around it. The yarn is then knitted in along with the ground yarn, plated over the ground wale.

This action in itself was easily accomplished on the old stationary-cylinder type of automatic machine, but in the revolving-cylinder type new complications arose. It was necessary to make the finger rotate in synchronism with the cylinder. With the finger rotating, the yarn feeding the fingers had to revolve also. It can be seen that these complications offered a stumbling block for some time. The obstacles have been successfully overcome by several concerns neatly and compactly.

The fad for mesh or net hosiery has asserted itself in no small degree in women's and children's hose. It seems perfectly logical that it should be received in a favorable light by men. The possibilities for designs are almost unlimited in this field. Mesh is made rather ingeniously on automatic hosiery machines. Two yarns are fed at one time, one fine or backing yarn and a coarse yarn which forms the mesh. The fine yarn knits on all the needles all the time. The coarse yarn knits on every other needle on one course and on the other half the next course, alternating. The needles are controlled by jacks, and pattern effects may be produced by arranging these jacks. Although this stitch is not a true mesh as is produced upon full-fashioned machines, on which the stitches are transferred from one needle to another, it presents a rather pleasing stitch and passes as a mesh. By combining the mesh attachment with a pattern mechanism, attractive patterns can be made.

A while ago there was introduced an innovation which, while it looked like a good idea, did not sell so well to the public as was apparently hoped. That was the garterless sock which had the elastic knitted into the top of an extra-long half hose to supplant the garter. Perhaps one of the reasons this idea did not sell was that the custom of college men and men of college age has been not to wear garters. This reason is abetted by the fact that the golf hose with the knitted-in elastic have proved more of a success. It would seem that it would be logical to start a campaign to make young men "garter-minded" before these socks will be accepted, for, after all, a new thing is dependent upon the younger generation for its success. It is difficult to "teach an old dog new tricks"

In spite of the overwhelming tendency for women to prefer full-fashioned hose to the circular variety, the demand for men's full-fashioned half hose has not increased to any appreciable extent. It is still made in solid, somber shades of higher-grade silk for the higher priced trade.

The use of shorts and slacks by men for sport and comfort has opened a new outlet for half hose in the form of anklets. Although most men declare they would not be seen at a dog fight clad in shorts and anklets, more and more fall for this decidedly comfortable mode of clothing each year. These anklets have not been in enough demand to anticipate a strong masculine desire, but manufacturers are ready to put them out in any design as long as there is a call for them. What's more, it is said that it may become stylish to wear two pairs of anklets at one time, under-sox of cotton for comfort and outer-sox of woolen for looks.

Automatic transferring of rib cuffs to the automatic machines was the dream of inventors for many years. It was on occasion accomplished, but the process was so complicated and so much slower than hand transferring that it was discarded. There have been some comparatively recent forward strides made—such as notably semi-automatic transferring, which eliminates a few hand motions. But the dream that seems to have superseded this dream is that of a machine which will knit the entire half hose with a rib cuff all attached. A machine has been developed which makes the entire half hose, but the cuff is not a true rib. While this cuff is remarkably ingenious, it does not have the elasticity and snap of a true rib cuff. So the inventor dreams on.

Looping is still a semi-automatic operation which seems to defy the most ingenious inventor to make completely automatic. Many disappointed men have started out to get rich quickly by inventing an automatic means of closing the toe of hosiery.

Hosiery Survey Shows Decided Trend to Fine Gauge

IMPROVEMENT in the full-fashioned hosiery industry as regards stocks, which was indicated in a preliminary report Feb. 4 on the survey conducted by the Industrial Research Department of the University of Pennsylvania, is further shown in a more detailed report of the same survey, which has just been made public. The later figures do not change the picture materially, but comprise important and interesting new data. The study was made in cooperation with the National Association of Hosiery & Underwear Mfrs.

The preliminary report indicated an existing stock of 2,412,280 doz. pairs, as of Jan. 1, and more complete figures from manufacturers recently received show the exact stock reported to be 3,186,560 doz. pairs, on that date. The stock reported represents about 90% of the industry, indicating that total full-fashioned hosiery stock in all mills is more than 3,500,000 doz. pairs.

With respect to gauge, it is significant that more than 80% of the stock at mills Jan. 1, 1932 was represented by 42- and 45-gauge stocks combined. The reports showed that the advance orders placed are mainly for 39- and 42-gauge merchandise.

Asked to estimate the dozen pairs that individual plants could produce at capacity, manufacturers' replies showed a total monthly capacity of more than 2,800,000 doz. pairs; assuming the reports to represent 90% of the full-fashioned industry, this would give the industry a capacity of well over 3,000,000 doz. pairs monthly.

Figures regarding capacity of the individual gauges are significant as showing the fairly steady trend toward finer gauges. Of the reported capacity reported in the current survey, only 13.7% was of the 39-gauge class, which contrasts with figures compiled in 1929 showing that one-third of all machines were 39-gauge type.

With respect to stock trends, the new report deviates somewhat from the preliminary statement. The former report based on fewer companies showed a drop of 12% in stocks between June 30, 1931 and Jan. 1, 1932, while the later figures indicate that the decline in that period was only 9.7%. The degrees of decline varied considerably according to gauges: 39- and 42-gauge stocks each dropped about 16%, while 45-gauge stocks increased slightly and 48-gauge stocks increased about 25%. This is further evidence of the pronounced trend toward the higher gauges.

"The November, 1931, production" the report continues, "was 11.6% greater than the June output, although the production of 42-gauge goods showed an increase of but 4.5%. Most of the production increases were of 45-gauge hosiery with its increase of 19%, and of 48-gauge production which increased 20%. The unfilled orders held on Jan. 1, 1932 by reporting concerns totaled slightly more than 600,000 doz. pairs. The total unfilled orders was 43.7% less on Jan. 1, 1932 than was held by the same concerns on June 30, 1931. Unfilled orders for every gauge of goods decreased noticeably, with the exception of 51-gauge merchandise for which orders increased.

"While total unfilled orders Jan. 1 represented only 22.7% of stock, it is surprising to note that 39-gauge stocks were represented by 40% of their total as unfilled orders. From June 30, 1931 to Jan. 1, 1932, the ratio of unfilled orders to stock decreased from 33.8% to 22.7%. These changes varied considerably by gauges. The 42-gauge ratio decreased from 40.5 to 25.9%; the 45-gauge ratio declined from 27.6 to 14.3%, but the 51-gauge ratio increased from 6.7 to 19.8%.

"Although stocks and unfilled orders declined throughout 1931, the reporting mills operated more nearly to capacity in November than they did in June, 1931. In June, the firms that reported operated at 67.4% of capacity as compared to 75.5% in November. This increase, however, may be attributed to a certain extent to seasonal fluctuations."

The accompanying table shows that about one-third of the productive capacity of the full-fashioned hosiery industry is located in Philadelphia and vicinity, while over 57% is within the State of Pennsylvania. The southern producing area provides 16.5% of total productive capacity. Concluding, the report states:

"In considering capacity of the industry, it is of importance to note the percentage that is operating under so-called union conditions. This is of peculiar importance in view of the drastic changes that occurred in union policy in September, 1931. From reports received from 90% of the industry, it appears that about 22% of the productive capacity of the industry is represented by those mills that have contractual relations with the American Federation of Full-Fashioned Hosiery Workers. During November, 1931, 22% of the productive capacity operating under union conditions worked at 81.2% of capacity as compared with a ratio of production to capacity of 72.8% for other mills."

Percentage Distribution of Stock on Hand, Unfilled Orders, Estimated Productive Capacity, and Production by Districts

	January 1, 1932			November 1931
District	Stock	Unfilled Orders	Productive Capacity	Actual Production
Philadelphia	27.7	38.5	32.0	31.2
Reading	16.9	21.5	14.7	14.6
Other Pennsylvania	10.0	7.8	10.7	9.4
New York-New Jersey	4.0	1.6	4.0	4.1
New York* New England	1.2	0.2	2.7	2.3
North Carolina	10.3	23.9	11.3	13.2
South†	4.3	3.1	5.2	5.2
West	25.6	3.4	19.4	20.0
Total	100.0	100.0	100.0	100.0

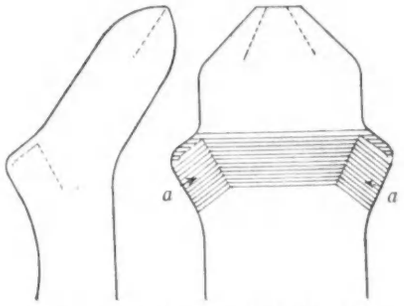
*Northern part of New York
†Other than North Carolina

Single-Unit Full-Fashioned Hosiery . . .

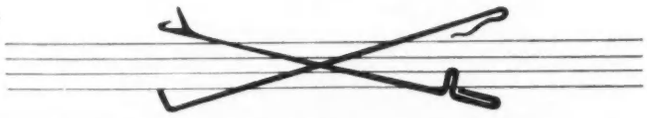
Its Present and Future

By Edwin D. Fowle

Associate Editor, TEXTILE WORLD



One type of single-unit full-fashioned stocking showing construction of heel fabric at "a"



THE single-unit full-fashioned stocking is a commercial reality; it can never be a commercial reality. The mechanism has been perfected; it is still full of "bugs." The machines are easy to run; they can be operated only by the most skilled knitters. Labor in topping is saved; more labor is required in looping and seaming. Look! they fit perfectly; look! they fit horribly. They are stronger; weaker.

When one attempts to look into the possibilities of the full-fashioned single-unit stocking—or single-operation stocking, as it is in some cases called—the above is a picture of the sentiment one uncovers in the trade. Unfortunately, there are available to the industry in general no data of any authenticity showing just what savings in operating costs are made possible by the single-unit machines, how many machines have been installed, what output the single-unit stockings have reached, and what success has been encountered in selling them. The conspicuous absence of such data is likely to establish the belief in the minds of many mill men that one or more of the following hypotheses are true: The savings are not great, few machines are installed, the sales are negligible.

But these hypotheses, if they prove true, are not necessarily destructive. Savings in the keen competition of today do not need to be great to be impressive—particularly if they are sufficient to pay for the new equipment in a reasonable period of time. The installation of a very limited number of machines when money is as tight as we now find it, is more to be expected than otherwise. Probably there are not in operation in the entire world more than 100 single-unit machines pretending to imitate the full-fashioned heel. In this country there are not in all probability more than half a dozen—to make a generous estimate. As for the third hypothesis, the fact that hosiery buyers are slow to purchase something for which no consumer demand has been aroused may well be laid to the caution of the era and also no doubt to the thorough job once done in educating this profession to the merits of the full-fashioned stocking as made on the legger and footer.

The hope has been expressed by parties interested in the promotion of single-unit knitting that the mills will take to themselves all the financial gain which the saving in operating costs may afford. With present relations between mill selling prices and mill costs, the thought is indisputably just; but if the buyer is to realize no greater margin of profit and is not to be in a position to offer the single-unit at a lower price than the hose he is now selling, how can his cooperation with the manufacturer be enlisted? Apparently in no way, unless the single-unit stockings are superior products and hold a quality appeal to the consumer. The idea sometimes expressed that for any extended period of time the single-unit hosiery can be sold to the buyer without his knowledge of the change in construction and method of manufacture strikes the writer as a fallacy—no matter how good the imitation may be. The single-unit method will be talked about, and the buyer will make it a point to determine by which method the hosiery offered to him was made. He will be very curious to know how the new development affects his profits and the satisfaction of his customers.

What possible superior qualifications do the single-unit stockings have? They have only one; viz., the elimination of practically all differences in shade between leg and foot. This by no means applies only to ingrain hosiery. It has been found that silk even from the same skein will produce fabrics differing in shade if knitted under different conditions. In most cases, however, such differences in first-quality hose are too slight to be observed by the buyer or consumer; and hence the advantage becomes one of lowering the number of seconds and so reducing one of the expenses which mills now face.

From the consumer's standpoint is this advantage offset by disadvantages? Here it is impossible to generalize, for the reason that there are several types of single-unit stockings, each differing in the heel and toe. Some of these are too new to permit of a mature judgment being passed on their qualifications. It is expected that two additional types of single-unit hosiery (not machines) will be exhibited by machinery builders at the Philadelphia Knitting Show next week. It is safe to say, however, that in most cases there is an undesirable construction in the heel or an undesirable proportioning of fabric between the foot and the instep, causing either tightness or looseness.

Since we must thus practically eliminate from our consideration of the possible merits of the one-machine method any appreciable advantage in quality of product, we come back again to the question of cost. Because the causes of differences in shade between leg and foot are

(Continued on page 89)

Swiss-Rib Fabric Returns to Popularity in Underwear Field

By S. M. Peterson

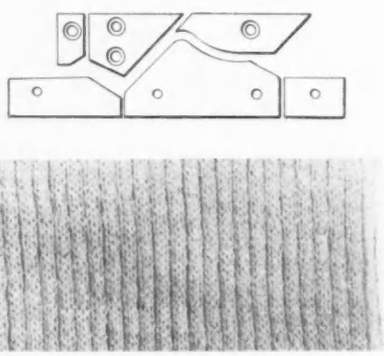


Fig. 1. Regular 2x2 rib fabric made with cams shown above

IN COMMON with the length of women's dresses, the style trend in women's underwear is constantly changing. Years ago a considerable quantity of Swiss-rib fabric was imported from Switzerland; and, for that matter, it is still being imported to some extent. The return to popularity of this Swiss-rib fabric in the underwear field, as well as the periodical return of other styles which were once in vogue, reminds us of the fact that "there is nothing new under the sun."

The writer at one time had charge of a mill where about half of the production was on a woman's V-neck, wing-sleeve, tight-knee union suits. These were knit from 50/2 mercerized yarn in three shades—light pink, light blue, and bleached white. They were knit 2x2 on regular twelve-cut machines.

In making this 2x2 fabric, the knitter always had a great deal of trouble in minimizing the number of drop stitches. It was almost impossible to knit this cloth without encountering these drop stitches and short "run-downs." When the knitter tried to overcome the trouble, he was more apt to develop holes in the fabric. The holes, of course, being harder to mend than the drop stitches and short run-downs, we logically preferred to combat the latter defects, as garments containing drop stitches could be mended neatly enough to pass as firsts.

Special Cams Used

We employed regular, plain knitting machines, simply removing every third needle in both the cylinder and the dial. We obtained the best results by running the dial as low as possible, leaving just room enough for the cloth to pass through, the stitch being regulated with the cylinder cam. Enough tension was applied to the yarn to cause it to deliver to the needles as steadily as possible and to eliminate jumping.

One day a bona fide Swiss-rib fabric was presented to us for duplication. When our sample was made and compared with the Swiss fabric, the criticism was that ours did not look like the sample which was submitted to us. Of course this was quite natural, as a genuine Swiss-rib fabric differs considerably from a common 2x2 rib. To make the Swiss-rib fabric, different cam provisions are needed; i.e., Swiss-rib cams must be used.

There is another fabric which is knit with Swiss-rib arrangement of cams; but in this case broader ribs are made, such as 6x2 or 5x3. These broad ribs are arranged to appear both on back and face according to a suitable design or on face alone. This is known as Richelieu rib.

In Fig. 1 is shown a sample fabric knit 2x2 with regular plain cams. The yarns used are 60/1 worsted and 80/1 combed peeler. These two yarns are twisted together before knitting. Directly above the fabric sample is shown the cam arrangement employed in making it. These cams are the ones used for knitting plain stitch.

Fig. 2 illustrates a 2x2 Swiss-rib-stitch fabric, the upper part of which is made of the regular stitch and the lower part of a tuck stitch. A No. 50/2 mercerized yarn is used for seven feeds, and a 150-denier rayon is inserted in the eighth feed. Cams are shown above fabric. Women's vests are made after the same fashion as the old women's rib-knit shaped vests, of which millions of dozens were made 40 years ago. These were constructed on automatic body machines having a ratchet-wheel and chain-motion attachment, enabling the machine to change cams automatically in the dial head so that a change could be made from a plain 1x1 stitch to tuck stitch.

Swiss-rib garments are now made on these automatic, chain-motion, body machines which are set up with every third needle removed from both cylinder and dial and which are fitted with the Swiss-cam arrangement. The bust portions of these vests are knit with a tuck stitch

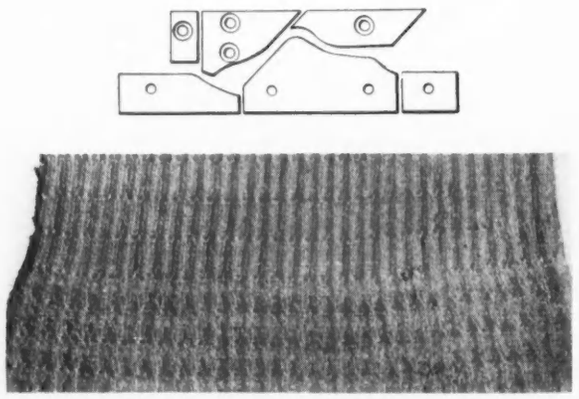


Fig. 2. Section of underwear fabric showing plain Swiss rib in upper section and tuck Swiss rib below

such as is shown in the lower part of Fig. 2, and the waist is knit plain as in the upper part of Fig. 2. The skirt is commenced with a tuck stitch, and then a plain portion is inserted, making what we used to call a rib-tail bottom—this being a border of about 3 in. in length. A vest of medium size—about 30 in. long—would be made up as follows: Bust, 7½ in.; waist, 3¼ in.; skirt, 10¼ in.; and rib tail, 2½ in.—making a total of 23½ in. for the knitted portion. The strip for making up the neck and arm holes would add about 6 or 6½ in. to the total.

Bloomers or tights are knit after the same fashion—i.e., plain 2x2 at the top for about 2 in., then tuck stitch for the body part, and plain 2x2 again for the cuff portion. At the plain part in the waste line an elastic band of about 1 in. in width is stitched on with a sewing machine, and the cuffs are finished off with an overedging stitch.

The make-up of tights of medium size is as follows: Plain waist line, 1 in. long; tuck-stitch body portion, 12 in. long; plain 2x2 for the cuff, about 3½ in. long—making with the elastic band a total of 17½ in. Vests and tights can be made on the same size of body machine.

Swiss-rib fabric really makes very attractive and light garments; and while women are the chief purchasers of these garments, they make suitable material for men's wear when made of good yarn.

Slow Output and Aggressive Selling Are Helpful to Underwear Mills

ADHERENCE to the policy of eternal vigilance, both as regards production and merchandising, has helped the knitted underwear industry materially during the recent difficult months. Conditions in the heavyweight branch were particularly acute last fall; the depression and its resulting hesitancy at the distribution end, together with a consumer trend toward lightweight underwear, combined to make for hard sledding. The problem was solved in large part by strict watch on production and a refusal to be stampeded.

Heavyweight underwear mills cannot enthuse over the season just closed; an abnormally warm December and January deprived them of much of their usual business, and the cold spell which March brought came too late to be of any help. However, these manufacturers can congratulate themselves on their foresight in holding down stocks. Thanks to curtailment, they were able to command reasonable prices, and there was no disastrous clearance at a sacrifice as might otherwise have been.

With the example of the last twelve months before them, it may be assumed that heavyweight underwear mills will follow the same policy of curtailment during the next few months. Production in some districts during spring was greater than necessary, and as a result prices showed some weakening at the end of March. However, as quality mills had not yet begun producing heavyweights, the problem was pretty well localized, and prospects pointed to a swift recovery of prices.

Delay of openings also has been a helpful factor this year. Mills are coming to realize that the days of January openings of fall lines are gone, and that buyers respond best when shown lines at dates more close to the actual retail season. Heavyweight underwear demand will develop later than ever this year; it may indeed be concentrated into the August-September period. While such would obviously mean a congestion, with some loss of business, it also would strengthen prices.

The high temperatures prevailing last winter proved a boon to mills offering medium and lightweight lines. With an average of almost 60 degrees in the Atlantic States through January, the spring and summer underwear lines found good movement. There was no prolonged dull period for rayons at all, and when spring arrived, many manufacturers had already enjoyed a good pre-season business. Barring the fluctuations in the primary market which had an unsettling effect, lightweight cotton underwear prices held fairly steady. For the most part, demand paralleled supply; in certain popular lines, such as women's novelty rayon garments, mills were unable to fill spot orders during March and were booking four weeks in advance.

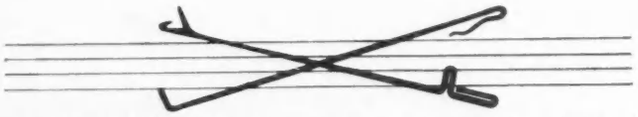
One interesting feature of the spring season was the strong call for men's lightweight ribbed cotton union suits. This line began to show activity in January and the demand became more spirited with the approach of warm season. The vogue may carry into the fall.

In a hesitant season, style emphasis is particularly valuable. Mills specializing in women's rayon underwear were able to partially offset the prevailing backwardness, by fashion innovations. Many new stitch effects were developed. The mesh theme, now so important in hosiery and spreading into knitted outerwear and even broadsilks, was utilized with very satisfactory results by the underwear manufacturers. The earliest of these new numbers, offered last fall, won favor; others sold well at Christmas; and today much of the spring demand in women's rayon underwear lines, is for the newest mesh styles.

A survey of current developments in the underwear industry would not be complete without reference to the aggressive merchandising job being conducted by the Associated Knit Underwear Manufacturers of America. This organization was particularly successful last year in offsetting price weakness, through a method of tracing down reports of mid-season reductions by individual firms; later, a campaign for curtailment was conducted, which was very helpful in holding down stocks.

Weighting *of Rayon Underwear Fabrics Continues*

By Winn W. Chase
Assistant Editor, TEXTILE WORLD



DELIBERATE cheapening of circular-knitted rayon fabrics continues. Prices fall. Sales of rayon undergarments decrease. Quibbling and disagreements impede cooperative efforts to prevent weighting and stretching. Saner elements persist in endeavors to end degradation of rayon knit goods before consumer dissatisfaction results in complete boycott against rayon underwear.

It is high time to face the facts.

Apologists for the practice to the contrary, the object of weighting of tubular-knit rayon underwear fabrics is to permit the sale of an inferior fabric or garment as one of a better grade. Weighting as applied to rayon knit goods is merely a temporary loading which disappears when the garment is washed; it must not be confused with silk weighting which gives to the fabric an increased weight which for all practical purposes is permanent. Nor should it be confused with processing of woven fabrics—either of rayon or other materials—where finishing agents are employed to give stiffness, softness, or another desired characteristic. Often, but not necessarily, stretching and weighting go hand in hand. Thus, in finishing circular-knit rayon goods, it is possible to stretch the fabric far beyond its original dimensions; it is possible also to add to the fabric epsom salt or other water-soluble compounds which temporarily increase the weight and enhance the appearance of the goods.

The amount of weighting and the degree of stretching vary; garments have been placed on the market which contain as high as 16% of weighting material; fabrics have been sold which have been stretched to more than 15% of the total area. When garments manufactured from stretched and weighted rayon are washed, the weighting agent is removed, the fabric returns to its original size; the garment shrinks, perhaps so much that it cannot be worn. If the goods have been weighted, but not stretched, upon washing, the sleaziness and cheapness of the fabric becomes apparent. In either case the reaction of the consumer is the same. She resents having been cheated; and in the future she will buy garments made from materials other than rayon.

The first to feel the resentment of the customer is the retailer, then the cutter up, the knitter, and finally the rayon producer. Sales fall off all along the line. Something must be done.

Rayon producers meet to discuss methods of curbing weighting. The trade press speaks out against this evil. A meeting of retailers, knitters, and yarn manufacturers is called. Proposals are made—without due consideration of the problem perhaps—that the amount of finishing material in circular-knit fabrics be limited to 1% and that the U. S. Department of Commerce adopt a specification to that effect as a trade-practice standard. It is pointed out that the limitation of stretching constitutes as serious a problem. Various factions form.

Meanwhile, weighting and stretching continue.

Further meetings are held, and the decision to organize an association of tubular-knit rayon manufacturers is reached. Still other meetings follow at which the following groups are represented: members of the newly organized circular knitters' association, tubular knitters not members of the association, underwear manufacturers other than knitters, retailers, rayon yarn producers, and dealers in finishing materials. Attempts are made to befog the situation with talk of delustering, silk weighting, and finishing of woven fabrics. Blocs are formed. One group—including yarn producers, independent knitters, and retailers—is insistent that weighting be limited to 1% and advocates that no tubular knit fabric be stretched in finishing in excess of 1 in. beyond the diameter of the knitting machine; another faction, centering around the knitters' association, is equally persistent that rayon underwear fabrics shall not be considered weighted unless more than 10% of finishing materials has been added. Builders of equipment for finishing tubular knit goods become involved in the controversy.

A suggestion that the U. S. Bureau of Standards be requested to sponsor a conference to work out trade-practice standards for the rayon knitters receives hearty support from some groups, is bitterly opposed by others. Bickering, wrangling, and caveling waste time and fray tempers. Knitters who thus far have refrained from weighting and stretching assert that they will be forced into this practice if it is not abandoned by all.

Long overdue, the rational thought is interjected into the argument that any decision in regard to weighting should be based on the results of a thorough investigation as to the amounts and types of finishing agents which properly may be employed. A committee appointed to correlate the various views, and to draw up standards which will be acceptable to the industry as a whole, fails to reach an agreement.

Committee D-13 is apprised of the necessity for developing tolerances for weighting and oil content of knitted rayon fabrics, and appoints sub-committee to report on methods for the determination of type and amount of weighting agents and oil on rayon.

Last year 32% of the total consumption of rayon was accounted for by the knitters of underwear fabrics. In February of this year the rayon market was less active than had been anticipated, the cumulative effect of the degradation of rayon underwear by weighting and stretching being called one of the major reasons for reduced sales. Rayon producers on a 60% production basis is predicted.

Weighting and stretching of circular-knit rayon fabrics continue.

Open-Work Designs Favored in Knitted Outerwear Fabrics

By W. E. Shinn

Professor of Weaving, Designing, and Knitting, Textile Department, Clemson College, S. C.

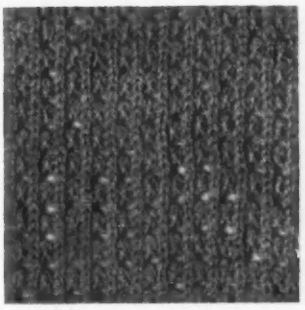


Fig. 1. Simple drop-stitch mesh pattern

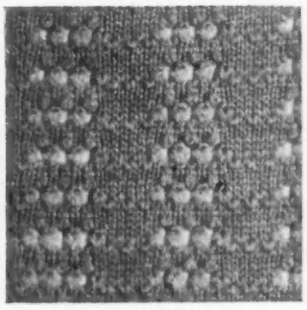


Fig. 2. Vertical mesh stripe, drop-stitch principle

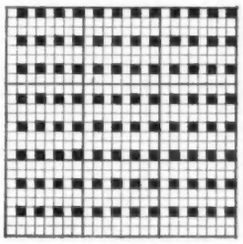


Fig. 1a. Design for drop-stitch pattern

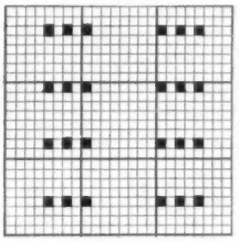


Fig. 2a. Design for mesh-work stripe

THE last year has witnessed a growing demand for fabrics with well-pronounced structural effects. The fabrics which have met with greatest favor have possessed qualities which may be enumerated as follows: openness and porosity, elasticity, strength and durability, emphasized texture, launderability, color fastness, and good draping qualities. While noteworthy contributions to the art of mesh-fabric construction have been made in both the weaving and knitting branches of the industry, the present discussion will be confined to some outstanding creations in the knitting industry, particularly in that branch which is engaged in the fabrication of Durene and other mercerized cottons.

Knitted mesh fabrics may be conveniently grouped in three principal classifications. The first group is made on the drop-stitch principle, in which certain needles are caused to throw off their stitches and produce open-work in the cloth according to some simple or more complex motif. The second group is made on the tuck-stitch principle, in which the needles are so controlled as to double or treble the loops to produce open-work or eyelet effects. This type of mesh fabric is usually produced on a jersey machine, although in certain instances the rib machine has been used successfully for mesh work. The third classification includes warp-knitted cloths, in which eyelet effects have long been a convenient style of ornamentation.

Drop-Stitch Effects

Knitted mesh fabrics are readily produced on circular jersey machines equipped with pattern wheels and tuck bars at all feeds. The pattern wheels are small disks mounted on the revolving cam ring. In addition to revolving around the cylinder, they are rotated on their own axes through contact with the needle butts. In rotating, they either lift the needles to the clearing position or permit them to pass the feed at the tuck level, depending upon the manner in which the periphery of the pattern wheel is nicked.

A mesh fabric made by the drop-stitch method is illustrated at Fig. 1. In the design for this cloth (Fig. 1*A*) the blank squares represent completed stitches, while the shaded squares represent drop stitches. It will be observed that the drop stitches occur on alternate needles and appear uniformly on every third course. To produce this pattern, every third feed is used for drop-stitch work. At this feed no yarn is supplied to the needles. The pattern wheel is cut to raise every other needle to the clearing position. The alternate needles remain in the tuck position. The needles which are raised to the clearing position shed their stitches while the others hold theirs, since they are in the tuck position. On the following feed all needles are raised to the knitting position. The empty needles pick up the stitches, and a course of jersey fabric is formed.

A mesh fabric with the open-work appearing in vertical stripes is shown at Fig. 2. The design for this cloth (Fig. 2*A*) repeats on twelve wales and six courses. Every seventh feed in this case is used to produce the drop-stitch work. To produce a stripe pattern, it is necessary that the drop stitches be formed on the same needles throughout the length of the cloth. The number of needles in the cylinder must therefore be a multiple of the number of wales in the repeat, and the number of nicks in the pattern wheel will be equal to or constitute a multiple of the number of wales in the pattern.

A fabric showing further application of the drop-stitch principle of producing mesh-work is shown at Fig. 3. In this cloth open-work is made in drop order by causing alternate needles to shed their stitches successively for six courses at intervals in the cloth. This cloth has sixteen wales and sixteen courses per inch and is constructed entirely of 20/2 Durene. Immediately preceding the beginning of the drop stitches a course of tuck

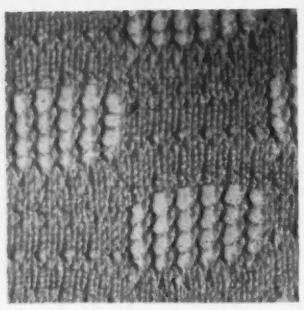


Fig. 3. Fancy mesh fabric—drop-stitch method

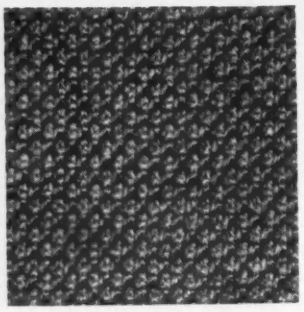


Fig. 4. Endless-chain mesh—tuck-stitch method

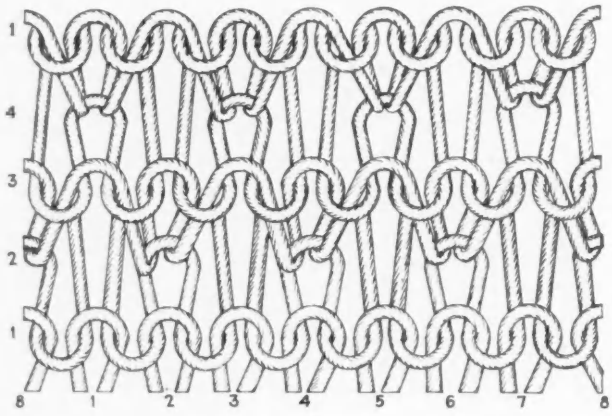


Fig. 4a. Design for endless mesh

stitches has been formed to act as an anti-runback. The fabric therefore does not develop runs due to the formation of drop stitches, and garments fashioned from this product may be laundered satisfactorily without damaging the structure or beauty of the goods. This cloth may also be produced on a circular jersey machine of the multiple-feed type, with pattern wheels. To secure a similar construction and weight per yd., a thirteen- or fourteen-cut machine would be required.

Knitted meshes of this type are suited for cardigans, jumpers, and knitted blouses. Their appeal lies chiefly in their sheer construction; soft, pastel colors; soft, subdued luster; firmness; durability; and good wearing qualities.

The Tuck-Stitch Principle

The second method of producing knitted mesh is based on the tuck stitch. The tuck stitch is formed by causing the needle to take on two or more loops before casting off. The stitches thus formed are therefore doubled or trebled depending on the interval at which the stitches are cast off. A fabric constructed in this manner is illustrated at Fig. 4. The cloth is knitted entirely from 20/2 Durene with sixteen wales and twenty courses per inch. This cloth is piece-dyed in soft, pastel colors and is highly suitable for sport dresses for both active and spectator sports. It is known as "endless chain mesh."

Fig. 4 is a diagrammatic view of the stitch formation in this pattern. The repeat covers two wales and six courses. It will be observed that on the first and third courses all needles have formed stitches, while on the second and fourth courses, only alternate needles have formed stitches. (It will also be seen that it is the even needles which stitch on the second course, while the odd needles stitch on the fourth course.) The others have carried theirs forward into the following courses. Wherever a tuck is formed a small opening is made in the cloth. This gives the fabric great porosity.

This effect may be secured on a jersey machine of the multiple-feed, pattern-wheel type with the pattern wheels cut to clear the needles as follows: first feed—clear all needles; second feed—clear 2, 4, 6, 8 needles, etc.; third feed—clear all needles; fourth feed—clear 1, 3, 5, 7 needles, etc.

A wide variety of mesh effects may be produced by varying the position of the tuck stitches and by extending them through more than two courses. Fig. 5*A* is a diagram of a knitted structure in which open work has been executed by forming triple tuck on groups of two needles in alternate order in the cloth. The fabric is constructed with 20 wales and 24 courses per inch from 30/2 Durene on a sixteen-cut jersey-type machine.

The pattern wheels for securing the effect shown in Fig. 5 would be cut as follows: First feed, clear all needles; second feed, clear 1, 2, 5, 6, 9, 10; third feed, clear 1, 2, 5, 6, 9, 10; fourth feed, clear all needles; fifth feed, clear all needles; sixth feed, clear 3, 4, 7, 8; seventh feed, clear 3, 4, 7, 8; eighth feed, clear all.

Herringbone Effect

Another interesting fabric development is the solid-color herringbone mesh illustrated at Fig. 6. This effect shows distinct influence of the woven pattern commonly

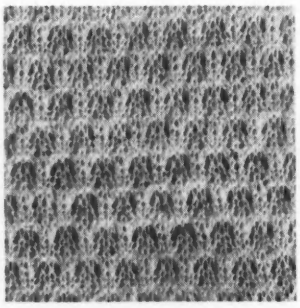


Fig. 5. Fancy mesh fabric—multiple-tuck method

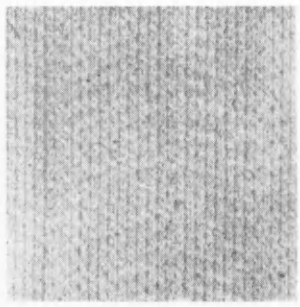


Fig. 6. Herringbone mesh—tuck-stitch method

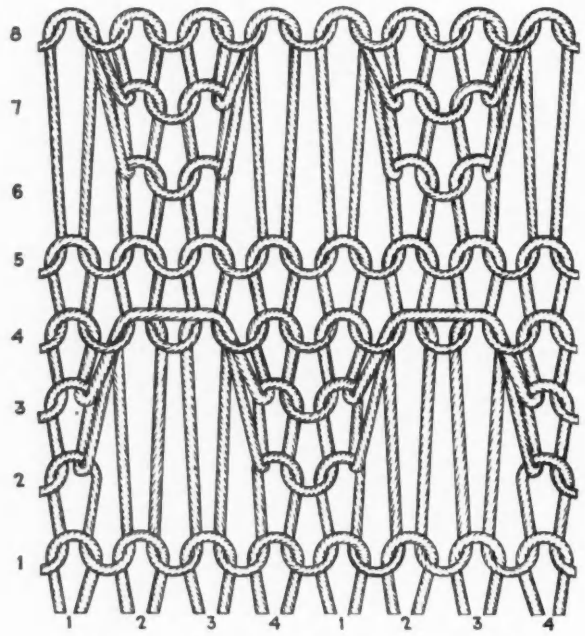


Fig. 5a. Design for fancy mesh fabric

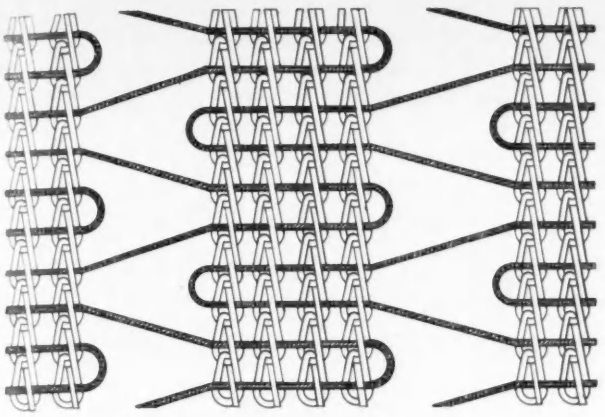


Fig. 8a. Design for warp-knit mesh

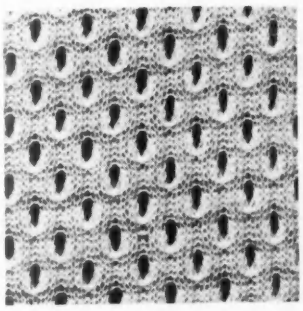


Fig. 7. Eyelet mesh —tuck stitch on Swiss-rib base

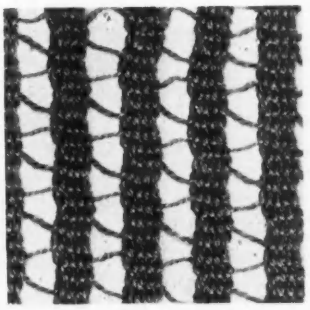


Fig. 8. Warp-knitted mesh of Durene

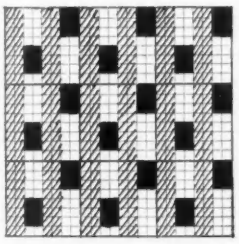


Fig. 7a. Design for eyelet mesh

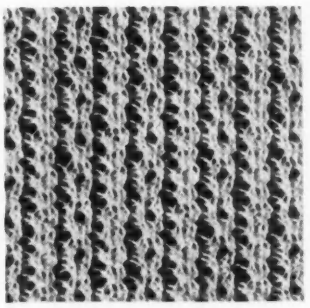


Fig. 9. Warp-knitted mesh emphasizing vertical ribs

called herringbone stripe. The basis of the pattern is the 2/2 twill. The repeat covers an area of twenty wales and eight courses. This fabric may be constructed on an eighteen-cut circular jersey machine with needle selecting wheels at each feed. Approximately half the needles are raised to receive the yarn at each feed, the selecting of needles being in the order of the 2/2 twill. This causes the fabric to have a relatively high number of courses per inch. The construction of this cloth is 20 wales and 48 courses per inch; yarn is 30/2 Durene.

This fabric, which was developed by the Josef Knitted Fabrics Co., has found favor in blouses and under-coat frocks for street wear. The colors are fast and permit the garment to be laundered successfully with no loss of luster. The color range is yellow, orange, red, green, brown, powder blue, and navy. Cloths of this type in which subdued stripe effects have been accomplished are popular at southern resorts, according to fashion experts; and it is expected that the interest will continue during the coming season for the wardrobes of those who travel extensively.

While it is true that the majority of the knitted mesh fabrics are made on the jersey base, the rib fabric lends itself to eyelet work also. The mesh work is produced on the dial needles as a rule. An example of this kind of knitted mesh is shown at Fig. 7. The foundation fabric is the 2/2 rib, commonly known in the industry as the Swiss rib. The perforations are secured by triple tuck work on the dial needles at short intervals through the length of the cloth.

The pattern, as shown in Fig. 7*A*, covers eight wales and eight courses. Assuming that the machine used in its production had eight feeds, the dial needles at the various feeds would be cleared as follows: feed number 1—clear all needles; feeds numbers 2, 3, 4—clear two, tuck two, clear two, tuck two; feed number 5—clear all needles; feeds numbers 6, 7, 8—tuck two, clear two, tuck two, clear two.

To enable the yarn to withstand the additional strain placed on it when the loop is being held for the long tucks, feeds two and three, and six and seven are threaded with two ends of Durene. The re-enforcing thread, in addition to making the work run better on the machine, adds extra durability to the fabric.

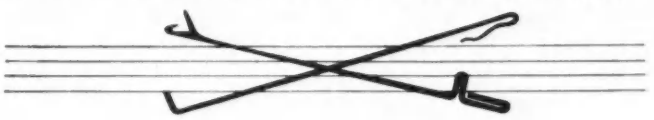
The outstanding qualities of this cloth are its great porosity and elasticity. It may be stretched over 100% in width without danger of rupturing, and it retains its shape very satisfactorily.

Warp-Knit Mesh

Fig. 8 is an interesting example of a warp-knitted mesh cloth with a very pronounced open-work stripe effect. Fig. 8*A* is a diagram showing the construction of this mesh. The repeat covers eight needles. The open-work is secured by causing several needles to remain idle at intervals of four needles. It will be observed that the stripes are formed by four wales which constitute the work of four needles, forming independent crochet stitches, the same thread being supplied to a single needle throughout the repeat. The wales are bound into a fabric by a second system of threads which cross from one group of wales to the adjacent group and back again. This system of threads is not knitted into the fabrics. It is merely inclosed in the loop of the ground fabric. The guides which carry the ground yarn do not traverse, while those which carry the binding yarn are traversed over a span of eight needles, the shift being made over four needles at each movement.

Perhaps the outstanding quality of the warp-knit fabric is its run-resisting property. The construction is such that even though a drop stitch is made in the fabric the run does not extend for any great distance. When the unsupported loop ravels back to a point where another thread was knitted on the same needle, the run is stopped. Since the yarns are ordinarily changing from one needle to another, only a small hole can result from a drop stitch. Another outstanding quality of the warp-knit construction is its relatively small amount of elasticity. For this reason it is adaptable to uses for which the ordinary knit fabric is unsuited.

A very interesting warp-knit mesh is shown at Fig. 9. In this cloth the rib effect has been emphasized by an open arrangement of the needles and short movements of the yarn control bars. The cloth is constructed entirely of Durene and makes an appealing pattern for blouses and similar garments for women's outerwear.



Swimsuit Mills Find Style Stress Offsets Hesitancy

AMID the uncertainties of the current bathing-suit season, some aspects stand out as significant. With buying more backward than in any year since the advent of the sun-suit, manufacturers face the prospect of a sudden congested demand, once the weather turns definitely warm. The first quarter of 1932 proved somewhat better than had been expected. November and December did not promise well; persistent price-cutting had made buyers hesitant, but January brought a steadying which was fairly well held to end of March.

Buying has been uneven; some mills, including both large and small units, claim bookings equal to last season, while others find much difficulty in getting business. Jobbers and retailers meet market prices willingly enough but the confidence of other seasons is lacking as regards future coverage. The total business placed up to the first week of March was estimated by one foremost knitter to be 50% below last season at that time. Despite a cold March, there was fair activity, and now the situation is slightly better. Volume is still so far below normal, however, that a congested demand during the next few weeks seems inevitable; indeed, it probably is already developing.

Stocks are moderate and there is talk of a possible shortage. This is out of line with January expectations, as numerous underwear mills added swimsuits to their line this season, indicating a larger output for the industry. However, this has been somewhat offset by two later developments: first, the slackening of production during February and March, and, second, the closing of some mills in the Philadelphia district, due to financial difficulties.

Even if they operated at capacity throughout the March-to-May period, mills could not produce the total of their normal eight months' production period, and it is certain that an early and hot summer would find the market flooded with orders which mills could not fill. Such would be costly to both manufacturers and distributors, as resulting in much lost business. However, weather is always a doubtful factor, and it would be risky to start capacity output immediately on the assumption of a belated rush of orders. Consumers' purchasing power is lower this year than last season and while bathing-suits are becoming a staple, there will unquestionably be a tendency to economize by using last year's suits—provided they have escaped the moths.

Styling Helps Sales

To some extent, and particularly in women's suits, the economy trend is being offset by new distinctive styling. Current lines of women's bathing-suits include numerous attractive and original effects. The mesh vogue in other knit fabrics has been an influence and recent offerings simulate mesh and lace patterns. One line which has been well received uses the waffle motif. Pastels appear to be less of a headliner, and some firms dropped these numbers in mid-season; buyers, it was noted, talked much about pastels, but placed orders chiefly for staple shades. The trend of color in women's swim-suits veers to medium tones; beachwear, however, continues to accent high colors.

Men's suits vary little in style this season. The call for the suspender model which is the one significant development of recent seasons in men's swimming wear, appears to be growing. It is still far from a major number, but manufacturers regard it as a coming thing. One interesting feature this season has been the emphasis on white. While certain mills complain that white suits for men have not done well, the larger companies report increasing interest. White also has become more popular in women's suits, and the conclusion of this season may find white established in both divisions of the market.

Mills could have gone much further than they did in stressing the style appeal this season, and in originating and interpreting new trends; however, considerable good work has been done in this direction. During March, buyers evidenced a desire for quality and style and those firms which were foremost in style development did the best business. A striking feature was the spirited demand for merchandise at the top and at the bottom of the price range. The intermediates were not so well received.

Trade leaders see style as more important than ever this season, and style emphasis is proving an effective way of offsetting the general hesitancy. The narrowing of the profit margin influenced some mills to curtail their styling activities, with unfortunate reaction on sales.

The summer prospect was concretely summarized by the New York representative of a world-famous manufacturer of bathing-suits as follows: "While we cannot speak for the trade generally, we ourselves do not see any cause for alarm. Volume is less than last year, but that was to be expected. We have no difficulty in getting our prices and we look for a firm market throughout the season. It does not seem that stocks can be excessive. Warm weather, coming early enough, would be a good help. Do not let us fool ourselves with the usual talk of shortage. I am a bit skeptical on that point; however, anything is possible in so bewildering a year. The cue for the moment is to move cautiously in production, and to promote actively, with particular stress on the smarter styles."

Distinctive Mesh Designs

Help Knitted Outerwear Demand

MANUFACTURERS of knitted outerwear were favored when fashion set its stamp of approval on mesh and lacey effects in women's apparel. Mechanically they were in a position to meet this demand quickly, and the last six months have seen a surprisingly varied development in knitted mesh outerwear. While the main stress was on sweaters, mesh also has proved important throughout the knitted dress field, and distinctive mesh designs in knitted dresses have enjoyed popularity. Observant style authorities see mesh as due for a long stay in hosiery, which suggests continued demand for similar styles in other knit goods divisions. Indeed, even as this article is being written, several important sweater manufacturers are planning a series of new style developments which will keep their lines abreast of the mesh fashion for some months to come.

Sweaters of wool, cotton, rayon and mixtures now show the mesh or novelty influence throughout. Knitted cotton fabrics, in particular have been developed along this line. Manufacturers of mercerized cotton yarn cooperating with the Durene Association of America, opened the year with many new novelty fabrics. Trellis mesh, the bow-knot, diagonals, the herringbone twill, corded stripes and crochets, were only a few of the numbers; these proved particularly popular in blousettes. Knitted blouses were a best-seller in the middle-west district and some mills were sold a month ahead. The new styles proved effective in stimulating demand at a time when buyers were generally very hesitant. Durene shantung was another of the rough-surface cotton fabrics proving important during the spring. These novelty effects were offered in all the popular spring colors, chiefly blues and greens, and latterly there was a decided trend to pastels.

Women's mesh sweaters were a leading line throughout January; the warm weather helped the style appeal in making for healthy volume. So keen indeed, was the consumer call for mesh outerwear, that prices held firm despite a downward trend in the general market.

Mesh was no less important in women's knitted dresses and ensembles. The one-piece knitted dress was a leader, especially in stripes and such designs as the waffle. Devil-red was the dominant shade, though the whole Colonial range of colors was favored. Knitted crepe also was an important fabric, and demand for this line has continued so steady that it may extend right into the warm months.

Later in spring, lightweight mesh dresses began to appear, the favored colors being rose, blue, green and maize. By that time, production was slightly ahead of demand and there was some price weakness. However, style interest had not waned and numbers which were new and distinctive sold steadily at list prices. Levels held firm at the better-quality end, and these manufacturers reported a satisfactory movement at fair margin.

The mesh vogue also has become important in men's outerwear, though of course, to a less pronounced degree. Early in the year, the pineapple design was a leader, as at the same time were also the stripe stitch effect and the duo-style stitch. Leading colors were beige, cocoa, maroon, black and white. The outlook for mesh in men's sweaters is doubtful. Conservative novelties unquestionably will win approval, and the recent appearance of attractive yet masculine mesh half-hose may be helpful in stimulating mesh sweater demand. An interesting feature of the early spring was the appearance of the reversible sweater, which was well received by the trade.

The tendency of women to buy and wear men's sweaters has become more pronounced and should have an important influence on styling during the coming season.

Men's novelty sweaters got off to a late start this spring, so far as volume was concerned, but there was good buying through March and the late openings of spring lightweight lines helped to spur buyer interest in these lines.

The Future of Mesh

While the future of mesh is no more certain in outerwear than in hosiery—and indeed any wane in mesh hosiery demand would undoubtedly react on the outerwear market—it may be accepted that it will continue important for some months. The mesh motif promises to be dominant in all the leading knitted dress lines for summer; it lends itself particularly well to sportswear and manufacturers are confident of a good response to their summer offerings. Continued development of new mesh designs in women's sweaters should make for steady movement of that line.

Development of novelty and fancy designs is essentially conservative in men's sweaters, but here too manufacturers have shown ingenuity and further tactful use of the mesh theme in men's apparel will aid in stimulating summer volume.

Pennsylvania Enters New Era *in its Knitting History*

By Charles W. Fisher

Philadelphia Editor, TEXTILE WORLD

FROM the earliest period in our colonial history, Philadelphia has occupied a leading position in the production of knit goods in the United States. In the Germantown settlement, the colonists had won a reputation for the quality of their goods, so that the name of "Germantown" has been indelibly impressed upon the history of the industry. As early as Dec. 10, 1723, the *Weekly Mercury* carried a reference to John Camm as a "stocking weaver." In 1759, a Rev. A. Burnaby, traveling through the colonies, wrote that "the Germantown thread stockings are held in high esteem," and stated that the production centered in that locality had amounted to as much as 600,000 dozen pairs in 1757, and that the average retail price was $1 per pair. Thomas R. Fisher, is credited with starting in 1825, in Fisher's Hollow, Germantown, the first knitting mill in the section, by assembling several machines under one roof.

With the development of the modern system of mill production, it was to be expected that this section should continue to maintain a leading position in the knitting industries. This rank it still holds, despite ever-changing conditions of modern life, exigencies of style demands, improvement of manufacturing methods, rapid expansion and growth of the country. The spreading of the industry to other sections through the effect of these influences, may have reduced the percentage of production in the Keystone State, but those identified with the trade feel assured that the production of knit goods, especially hosiery, will continue to be largely concentrated in this Leicester of America, for many years to come.

Various factors have been responsible for the recent reduction in actual number of knitting mills in Pennsylvania. Many of the smaller plants have become absorbed or merged with larger units. Others found it advantageous to remove to other localities, where conditions appeared to offer inducements such as lower labor costs, opportunities for expansion, and local financial support of a substantial character. Financial stringencies arising because of varying conditions, some of which were beyond their control, have also accounted for the elimination of some units. Style changes, such as the reduced consumption of knitted underwear (especially in women's lines), the decline in knitted neckties, etc., have been responsible for some reductions in the number of mills. However, one well-known factor in the industry points out that even with the location of hosiery mills in other parts of the country, many of these units are today sending their goods in the gray to be dyed and finished in the Philadelphia section, which goods contribute to the already large production of hosiery in that territory.

A check of the 1926 and 1931 editions of the *Official American Textile Directory* reveals the fact that the number of units engaged in the production of various types of knit goods was along the lines indicated in the table on the next page. Some of these units were producing several different types, which might make some duplication.

The largest declines are to be found in the production of seamless hosiery, and in knitted underwear, where style changes have played an important part. Recently, several of the mills engaged in the manufacture of women's semless hosiery, have either changed over completely to the production of full-fashioned lines, or have added that line, looking to a gradual but complete change to the full-fashioned goods. A check of the 1931 directory reveals the fact that in Pennsylvania there are six mills engaged in the manufacture of both full-fashioned hosiery and underwear, while nine mills are producing both full-fashioned and seamless goods. In Philadelphia, there are ten mills making both full-fashioned and seamless hosiery. This indicates that the transition is still taking place.

Since the manufacture of full-fashioned hosiery was introduced into this country, Philadelphia and Pennsylvania have occupied a dominating position. Their increase in full-fashioned equipment in 1931 is estimated at $2\frac{3}{4}\%$ against $2\frac{1}{2}\%$ gain in all territories.

With the increasing demand for full-fashioned hosiery, it was natural there should be development of the industry in other section of the country. This would reduce the lead of Pennsylvania in number of mills. However, increased size of the units in Pennsylvania has also tended to offset gains elsewhere indicated by the number of manufacturing plants. Philadelphia alone stands out head and shoulders above any locality as the center for the production of full-fashioned hosiery. According to estimates published for March, 1931, Philadelphia is credited with 4,884 full-fashioned hosiery machines, as against 16,400 reported for the entire country, although there are those who believe that 15,000 would more truly represent the installations now in place. In 1930, Pennsylvania was credited with 8,750 machines as against 14,829 for the entire United States, or 60% of the producing equipment. The development of plants in other sections of the country has naturally reduced the lead of Philadelphia, as for example, in 1919, 28 mills represented over 30% of those of the United States; in 1925 62 mills in Philadelphia formed nearly 40% of the whole country, while in 1929, 84 firms operating 95 mills, were $33\frac{1}{3}\%$.

An interesting index as to the size and importance of these units is found in the fact that 10 of these mills now employ more than 500 workers each. One mill alone employs almost 2,000. There were also 17 mills employing from 200 to 500 workers. The full-fashioned hosiery industry is said to be the largest employer of labor in the textile mills of Philadephia.

It has been asserted that much full-fashioned hosiery equipment in Philadelphia mills is made up of the older machines, representing coarser gauges and fewer sections per machine. While this may be true, Philadelphia manufacturers have not been negligent in the matter of installing the latest types of machines. In fact recent style and merchandising demands have seen an increased interest in the use of such gauges as the 39 for certain effects, and it has frequently been noted that difficulty has been experienced in securing machines in this gauge.

Still another indication of the importance of Philadelphia and Pennsylvania in the production of full-fashioned hosiery is to be found in the estimates made by the Industrial Research Department of the University of Pennsylvania. According to its figures, the U. S. production of full-fashioned hosiery in November 1931, which is taken as a typical month was 2,400,000 dozen pairs of women's hosiery. Of this quantity, Philadelphia is credited with producing 30%, and Pennsylvania with between 60 and 65%.

Those closely associated with the industry believe the future of Pennsylvania's—and especially Philadelphia's —industry, lies in the ever-increasing demand for finer qualities and specialties due to style trends. With the advantage of an available supply of trained and skilled workers, it is pointed out that these mills are in better position to produce the finer lines.

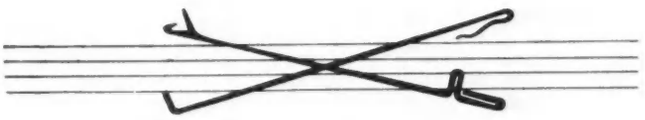
With the rapid growth of demand and production of full-fashioned hosiery, it was to be expected that there should be a reduction in the number of mills producing seamless goods. This is indicated in the tables shown earlier. As a lower-priced product, it was inevitable for seamless goods to be made where lower costs prevail. Therefore some of the Pennsylvania mills making these lines went to other localities. Still more, especially those making women's goods, installed full-fashioned machines. One prominent manufacturer, long identified with the production of fine quality men's and women's seamless hosiery, stated that he found it not all difficult to make this change. While the operation of a full-fashioned machine is recognized as a difficult art, requiring a year or more of experience before the operator is regarded as an expert, this manufacturer states that he always felt that the job of a seamless knitting machine fixer was just as difficult, and in some ways more complicated. Some seamless manufacturers have also been operating successfully on modern equipment in producing lace novelties which have found a ready market because of a price advantage.

Reduction in the number of mills on men's half-hose was also not surprising, with the gradual elimination of those mills making only the cheaper grades of goods and staple lines which could be produced more economically in other localities. However, the production of novelties and fancies has been well maintained by those mills that were quick to sense the trend of the market.

Another marked change in the aspect of the knit goods industry in Pennsylvania is also to be found in the production of knitted underwear. For many years the Schuylkill Valley was thickly settled with mills engaged in the manufacture of women's and men's cotton knit underwear. Changing styles however caused a marked decline in the sale of these goods, particularly among the women. Many mills sought other locations with an advantage in lower production costs to meet the competition. Others closed their mills entirely and went out of business. Still others, however, met directly the increasing business in rayon and silk lines. They either changed over completely to those lines, or produced both types of fabrics. According to the list given below it is seen there are 103 mills manufacturing underwear of cotton, silk or rayon. Pennsylvania has within its boundaries a mill regarded as the industry's largest single consumer of rayon for underwear, while many others are recognized as leaders in that field. Recently the development of tuck stitch or similar fabric as a merchandising feature has instilled new life in the production of women's underwear. There are also indications that the publicity given to the advantages of knit fabrics for men's underwear has resulted in a growing demand, especially in the pull-over shirts. In 1926, the underwear production in Pennsylvania amounted to almost $33,000,000.

While other localities may be able to show a larger number of plants, the fact is recognized that the average size of the Philadelphia unit compares favorably with that of other centers. For example the total value of knit goods manufactured in the Philadelphia industrial area according to the 1929 census was $164,821,444, which is first among all industrial areas in the United States. The New York industrial area is credited with having 469 knitting plants in that year, as against 264 knitting plants in the Philadelphia industrial area. However, the goods produced within the New York district in that same year were valued at only $107,184,673, an average of $228,538 per unit against Philadelphia's average of $624,323.

During 1931, the Philadelphia Business Progress Association recorded the establishment of four new knitting mills in that city; they also record the fact that ten plants in that district expanded their operations. This seems to indicate stability in the leading industry which has long been identified with the commerce of the city and State.



1926	Pennsylvania Outside of Philadelphia	Philadelphia
Full Fashioned Hosiery.....	31	73
Half-hose seamless	97	4
Ladies seamless	31	32
Ladies and ½ seamless.....	60	28
Childrens and Infants.....	34	22
Cotton Underwear	109	4
Rayon and Silk Underwear...	11	6
Cotton and Rayon Underwear.	6	2
Outerwear	34	104
Miscellaneous	3	48
Total mill units.....	416	323

1931	Pennsylvania Outside of Philadelphia	Philadelphia
Full Fashioned Hosiery.....	90	91
Half-hose seamless	58	2
Ladies seamless	19	11
Ladies and ½ hose.....	22	7
Infants and childrens	24	18
Cotton Underwear	51	..
Cotton and Rayon Underwear.	20	2
Silk and Rayon Underwear ..	24	6
Outwear	31	76
Miscellaneous	11	33
Total mill units.....	350	246

Remarkable Growth of Knitting Industry in the South

By Ralph C. Maultsby
Southern Editor, TEXTILE WORLD

THE development of knitting in the southern States, since its introduction as a machine industry about 1890, has been featured by a remarkably steady growth, reaching its greatest activity during the World War period and again in 1927-29. Certain districts in the South have become leading producers of particular types of knit goods, and, while this development has taken place within a comparatively short space of time, there have been many disappointments and failures mixed with the successful enterprises.

First Mill in 1889

Accurate information concerning the first efforts to introduce machine knitting in the South is incomplete and what details we have in many cases are rather fragmentary. With reference to concerns still in existence, however, available data shows that the Scotland Neck (N. C.) Cotton Mills, which began the manufacture of knit underwear and hosiery in 1889, is now the oldest. This company was organized for the purpose of spinning cotton yarn for the market, but, before the building had been completed, it was decided to install knitting machines. The underwear department was later discontinued and the company in the last 25 years has devoted its attention almost exclusively to the manufacture of children's and misses' hosiery.

It is significant that in 1889 Branson & Son, of Philadelphia, introduced a partially automatic seamless machine, circular and self-reciprocating, and there began shortly afterward a great demand for cotton hosiery. Closely following the venture at Scotland Neck was the organization, in 1890, of the Alden Mills, at New Orleans, La., with capital of $2,500. This concern began business with a few 108-needle hand-knitting machines and the first case of goods was shipped from the plant on March 14, 1891. In 1894, realizing the importance of scrapping obsolete equipment, the company replaced its original machines with 108-needle full-automatic machines. The following year a new one-story building was erected.

The Alden Mills, in 1896, installed the first aniline black hosiery dyeing plant to be established south of Baltimore. Many of the hosiery mills in the Carolinas, Tennessee and Georgia began shipping their goods to New Orleans for dyeing, in preference to Philadelphia and Baltimore where they had formerly been dyed. The Alden Mills, in 1900, opened a New York office under their own name and from that time have followed the policy of selling their own products. The company, under the able management of the McLellan family, has grown until there are now three plants with total equipment of 900 seamless knitting machines, 28 full-fashioned machines (42-gauge), 5,000 cotton spindles, and a complete silk throwing and twisting plant.

A Group of Pioneers

Among the pioneer hosiery mills in the South, in addition to those already mentioned, were the Atlanta (Ga.) Hosiery Mills, established in 1895; Grantville (Ga.) Hosiery Mills, Richmond Hosiery Mills, Rossville, Ga., Excelsior Mills, Union, S. C., and the Daisy Hosiery Mill, Burlington, N. C., all of which were started in 1896. The Holston Mfg. Co., Knoxville, Tenn., was organized in 1897, Durham (N.C.) Hosiery Mills were incorporated the following year, while the Marietta (Ga.) Knitting Co. was also chartered in 1898. Danville (Va.) Knitting Mills were incorporated in 1899.

The beginning of the knit underwear industry in the South did not come as early as that of hosiery. Lewis Jones Knitting Co., at Winchester, Va., manufacturing children's and women's knit underwear, was chartered in 1895, and the Standard Knitting Mills, of Knoxville, Tenn., were established about 1900.

Many of the early attempts to organize companies to manufacture knit goods in the South were unsuccessful. These failures were caused in most cases by a lack of sufficient working capital. inefficient management and poor equipment. In the early 90s, for instance, John Meyer established a small plant at Valdese, N. C., with 12 knitting machines, two loopers and other complimentary equipment for making men's half hose. This mill was not a successful venture, because of limited working capital, and after a year's operation the machinery was moved to Newton, N. C., about 25 miles away.

Some of the handicaps under which these pioneer hosiery manufacturers began operations may be illustrated by the experience of John Meyer. According to C. F. James, owner of the Elizabeth James Mills, at Marion, N. C., "Meyer was considered a good manufacturer and, being acquainted with the details of making hose, he taught the inexperienced workers the handling of each operation. Production was rather slow as the knitter had to make the body of the hose by hand; and, at the same time, in making the heel and toe the raising and lowering of the needles was also a hand operation.

"Dyeing was done in a tub, the hosiery being stirred by an extractor, but exposed to the air and then put on forms and placed in a press that held six hose at a time. One can imagine the speed of the finishing department of a hosiery mill at this rate. Wages paid by John Myer were merely nominal. Boys and girls made from $1.00 to $3.50 per week. Men made an average wage of $7.50 to $8.50 per week."

It was natural that, with inexperienced labor, limited capital for purchasing equipment and materials, the South engaged exclusively in the production of coarse knit goods, principally cotton hosiery and underwear, in the first years of its knitting experience. The trend toward finer gauge production became very conspicuous about 1920 with the advent of rayon and the introduction of full-fashioned knitting in the South about this time. Many of the most successful southern mills are now manufacturing the finer gauge products, in seamless and full-fashioned hosiery, and in underwear.

According to tables published in the *Official American Textile Directory,* with figures taken for representative years at intervals since 1909, the rate of growth of knitting mills (all kinds) in the southern States, has been as shown in Table I:

The number of knitting mills in the South has increased approximately three-fold during the 22-year period covered by the above table. The most accurate yard-stick for measuring the growth of knitting in the southern States, however, is that of unit production of knit goods. These figures given for hosiery production (all kinds except infants' and athletic and golf hose) in thousands of dozen pairs (Biennial Census of Manufactures: U. S. Department of Commerce), are in Table II.

The six southeastern States, which in 1921 produced only 35.2% of the country's total output of hosiery, by 1927 were manufacturing 49.2% of the total United States production.

The same six States in 1927 produced 25.6% of the country's total output of knit union suits.

The most recent expansion in knitting in the South has been in the full-fashioned hosiery division of the industry. It was not until 1921 that the first full-fashioned machines were installed in a southern mill. Pioneers in full-fashioned knitting in this section were Wiscassett Mills Co., Albemarle, N. C.; Hoover Hosiery Co., Concord, N. C.; and the Durham (N. C.) Hosiery Mills. Figures compiled by Textile Machine Works in 1931 revealed that 1,874 full-fashioned machines, or 11.5% of the country's total, were located in the southern states: Maryland, Delaware, Kentucky, Virginia, North Carolina, Tennessee, South Carolina, Georgia, Alabama, Louisiana, Mississippi and Texas. More than 200 additional full-fashioned machines were installed in these States during 1931.

The development of knitting in the South resulted in the establishment of spinning, mercerizing, dyeing, finishing and other complementary industries in the principal knitting centers. Thus we had the rapid expansion of combed yarn spinning in the area around Gastonia, N. C., and later the organization of yarn mercerizing enterprises at Chattanooga Tenn., Mount Holly, N. C., Spindale, N. C., Belmont, N. C. ,and Burlington, N. C. Yarn dyeing and finishing plants have been located at key distribution points to serve the South's knitting industry.

More recently the growth of full-fashioned hosiery knitting has brought with it the development of silk throwing in the South.

Current Trends

In full-fashioned hosiery knitting, to a much greater extent than in any other branch of the knitting industry, there occurred a migration of plants from the Middle Atlantic States to the South. This movement reached its greatest activity about 1928-29 and, while in recent months some equipment of bankrupt mills in Pennsylvania and New Jersey, has been purchased by southern mills and transferred to Tennessee and North Carolina, the last two years have witnessed practically no migration of going concerns to the South. This change has been caused largely by a reduction in the cost differential between the North and the South, particularly with respect to direct labor costs.

Southern manufacturers, in the majority of cases, have not hesitated to replace obsolete equipment when such action became necessary. The trend to finer gauges in certain types of hosiery due to style changes has created an important obsolescence factor. Hanes Hosiery Mills Co., Winston-Salem, N. C., one of the largest and most successful seamless hosiery manufacturers in the country, is an excellent example of a concern that has always been alert to style changes and constantly followed a policy of replacing obsolete equipment. Many southern concerns that originally made seamless hosiery have discontinued this branch of their business and are now concerned exclusively with the manufacture of full-fashioned hosiery.

Another tendency among southern manufacturers has been to pay more attention to the merchandising of their products. Some lines of hosiery and underwear made in the South have been advertised nationally under mill brands and now enjoy extensive consumer recognition. Durham Hosiery Mills were pioneers in the national advertising of their hosiery, followed by the P. H. Hanes Knitting Co., Winston-Salem, N. C., manufacturers of underwear; May Hosiery Mills, Burlington, N. C.; Davenport Hosiery Mills, Chattanooga, Tenn.; Richmond Hosiery Mills, Rossville, Ga.; and several other southern knitting concerns.

TABLE I — NUMBER OF ESTABLISHMENTS

State	1909	1916	1921	1926	1931
Alabama.....	6	5	11	15	22
Georgia.....	22	27	40	41	55
North Carolina...	62	83	179	148	184
South Carolina...	7	10	15	12	19
Tennessee.....	22	36	80	77	79
Virginia.....	11	15	17	21	29
*Other states.....	3	5	5	11	12
Total.....	133	181	347	325	400

*Note: Louisiana, Mississippi and Texas.

TABLE II — HOSIERY PRODUCTION

(In thousands of dozen pairs)

State	1921	1923	1925	1927
Alabama.....	959.4	1,173.6	1,671.1	2,231.2
Georgia.....	4,625.0	8,738.6	6,417.4	6,163.2
North Carolina.	11,666.2	15,608.0	17,921.1	25,954.0
South Carolina.	884.9	1,014.0	804.1	2,202.3
Tennessee.....	8,920.8	12,270.3	12,152.0	12,033.3
Virginia.....	1,213.7	1,929.7	1,981.5	2,255.9
Total.....	28,270.0	40,734.2	40,947.2	50,839.9
Total for the United States	80,240.9	97,432.9	99,777.4	103,166.9

Note — Separate data for Louisiana, Mississippi and Texas not available. Production of these states, however, has been included in total figures for the U. S.

TEXTILE WORLD GUIDE to Knitting Arts Exhibition

DETAILED descriptions of the booths at the twenty-eighth annual Knitting Arts Exhibition, at the Commercial Museum, Philadelphia, April 11 to 15, are given on this and following pages. In the report of each individual exhibit is a list of the products which the exhibitor has chosen to display on this occasion. The booth numbers may be used in conjunction with the floor plans presented on page 81 in order to locate any particular exhibit in which the visitor may be interested. The abbreviation "Rep." is used in the following paragraphs to indicate the company representatives in attendance.

Aberfoyle Mfg. Co., Philadelphia. Booths 242, 243, 244, 271, 272, 273. Featuring Aberfoyle Durene. Rep.: J. P. Holt, E. L. Dale, J. A. Holt, T. H. Vetterlein, C. D. Gott, R. Yeabsley, F. W. Hancock, Jr., E. F. Golden, J. F. McCrudden, C. B. Rapp, R. White, H. Lineberger, F. G. Miller, J. J. Neil, S. Keare, E. J. Neal, H. C. Mosher.

Adamson Bros. Co., New York. Booths 64, 65, 66. Lastex knitting yarns, knitted fabrics made of Lastex; immunized cotton yarns. Rep.: E. F. Roberts, E. I. Reynolds, P. Linke, J. Fodor, Chas. Neeld, A. G. McKinnon, D. Dietz, P. Adamson.

Adelphia Textile Co., Philadelphia. Booth 142. Double-resist and Indanthrene dyed Japan tram, spun silk, and mercerized yarns for hosiery. Natural and dyed looping and seaming threads. Rep.: J. T. Hunter.

Ainslie Knitting Machine Co., Inc., Brooklyn, N. Y. Booth 416. Equipment for manufacture of circular and warp-knitted millinery braids, bandings, etc. Machine for making seamless berets and knitted hoods. Rep.: L. Broadwin.

American Aniline & Extract Co., Inc., Philadelphia. Booth 85. Space will be used as a reception room. Plant will be open to visitors and demonstrations made of new products. Rep.: A. B. McCarty, G. S. McCarty, T. P. Key, E. C. Titus, F. A. Carsten, Jr., L. A North, W Myers, F. A. Tomalino.

American Bemberg Corp., New York. Booths 250, 251. Various sizes and put-ups of Bemberg yarns and knit fabrics made therefrom. Featuring seamless and full-fashioned hosiery, men's half hose; circular-knit fabrics of 80 and 100 denier; single-bar and two-bar tricot fabrics, plain and mesh; all-Bemberg and Bemberg and silk milanese fabrics; stressing 40- and 52-denier fabrics throughout. Rep.: J. H. Shinn, T. H. Johnson, H. L. Chapell, Mrs. L. Huston.

American Enka Corp., Enka, N. C. Booths 333, 334. Rayon yarns. Featuring "Perlglo," a natural subdued-luster rayon. Rep.: C. McD. Carr, H. H. Anning, R. J. Mebane, R. R. Faison, J. C. Scott, A. J. Van Laer, G. Leahy, J. J. Schilthius.

American Glanzstoff Corp., New York. Booth 326. Space to be used as reception room. Rep.: J. J. Merlein, Chas. F. Johnson, E. E. Steidler.

American Laundry Machinery Co., Cincinnati, Ohio. Booths 226, 227, 228. Hosiery dyeing and finishing equipment. Emphasizing Super-type rotary dyeing machines; "Monex" extractor for handling small lots; 40-in. O.T. extractor; and double-unit silk impregnator for silk soaking. Rep.: R. C. Caine, G. G. Rups, H. G. Mayer, C. F. Fischer, and representatives from foreign offices.

American Moistening Co., Providence, R. I. Booth 73. Amco self-cleaning atomizers, humidifiers, air and electric humidity controls, psychrometers, and hygrometers. Featuring the Amco Amtex humidifier for rooms of limited areas, such as test rooms, broker's display rooms, research laboratories, and vaults. Displaying also Amtex humidifier in operation with automatic control and Amco self-cleaning atomizers in one- and two-way installations. Rep.: W. P. Woodcock, L. C. Brightman, H. E. Branch.

American Thread Co., New York. Booths 264, 265. Cotton and mercerized threads for all purposes. Rep.: Philadelphia salesmen and executives from New York headquarters.

American Wool & Cotton Reporter, Boston. Booths 15, 16. Textile publishers.

American Yarn & Processing Co., Mount Holly, N. C. Booths 319, 320. Mercerized yarns. Space to be used as reception room. Rep.: C. E. Hutchison and others.

Edward R. Ammon, Reading, Pa. Booth 330. Expanding inspecting machines, "Countematic" automatic counting machines, both for hosiery. Featuring expanding inspecting machine for half hose and air-operated expanding inspection machine for women's full-fashioned hosiery. Rep.: E. R. Ammon, Wm. F. Geibel.

Arrow Needle Co., Manchester, N. H. Booth 71. Latch needles. Rep.: G. L. Heaton, Jr.

Atwood Machine Co., Stonington, Conn. Booths 86, 87, 88. Throwing machinery, including "Stonington" winder, 5B double-twister, Monarch double-deck twister, and double-deck utility twister. Rep.: E. H. Peirce, A. L. Lewis, T. A. Dewhurst, J. R. Breen, F. Sails, I. R. Rowe.

Bay State Thread Works, Springfield, Mass. Booth 399. Sewing threads for knit goods and rayon trade. Rep.: J. D. Perrin and others.

Biddle-Gaumer Co., Philadelphia. Booth 13-AA. Silk oiling device for lubricating silk yarns on winding or knitting machines. Rep.: G. L. Sherman, Jr., Jas. F. Flaherty.

Boger & Crawford, Philadelphia. Booths 277, 278. Fine mercerized yarns. Rep.: R. C. Boger, W. J. Crummer, H. H. Haff, D. R. Jonas, T. F. Haigh.

H. Brinton Co., Philadelphia. Booths 164, 165, 166, 205, 206, 207. Circular knitting machines. Rep.: W. H. Allerton, S. Bittle, J. R. Forrest, H. S. Horrocks.

H. W. Butterworth & Sons Co., Philadelphia. Booths 283, 284. Hosiery dyeing machines of paddle-wheel type and of 2- and 4-pocket rotary type. Fifty-pound size new package dyeing machine . Rep.: J. E. Butterworth, H. W. Butterworth, Jr., DeH. Butterworth, A. Molt, W. E. H. Bell.

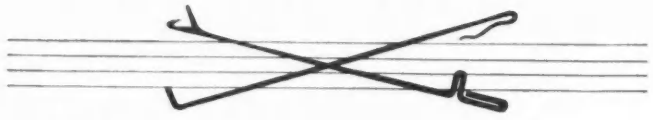
Cameron & Pfingst, Philadelphia. Booth 155. See Geo. B. Pfingst, Inc.

Cannon Mills, Inc., Philadelphia. Booth 190. Space will be used for reception room. Rep.: S. M. D. Clapper, H. E. Aken, C. V. Albright, M. B. Foil, E. W. Lancaster, C. F. Peffer, C. H. Fenn, J. J. Klumpp, H. R. Barker, H. Crumbliss, R. H. Shaen, J. B. Pope.

Celanese Corp. of America, New York. Booths 342, 343, 344, 368, 369, 370. Various types and put-ups of Celanese yarns. Celanese knit goods, woven fabrics, and garments, such as men's and women's hosiery, underwear, bathing suits, and knitted outerwear. Rep.: H. Price, N. da Parma, H. O. Shuptrine, K. C. Loughlin, F. W. Frank, P. J. Holmes, B. Guild, J. G. Cook, C. T. Francis, G. Kahn.

Clifton Yarn Mills, Inc., Clifton Heights, Pa. Booths 144, 145. Brambles, ratines, boucles, frills, velvets, and slub yarns of various fibers and combinations and in various colors and package forms. Displaying knitted garments and fabrics and the yarns from which they were made. Rep.: T. Barker, L. Ivers, C. A. Mitchell.

Cloverleaf Mfg. Co., Honesdale, Pa. Booth 382. Fiber-head, stainless-steel-head, Bakelite-head, Udylited-head, and all-metal bobbins; pin and cone boards; steaming crates; reel arms; metal reel caps; metal cones. Rep.: R. P. Bennett, R. E. Marcy.



Collins **Loom Works, Inc.,** Amsterdam, N. Y. Booths 389, 390. "Marvel" tricot machine in operation. Fabric knitted on the Marvel, and made up garments and hosiery. Rep.: F. J. Collins.

Columbia Steel Equipment Co., Philadelphia. Booths 331, 332. Examining, pairing, topping, and cutting tables; conditioning, moisture, and needle cabinets; bobbin and work boxes; wardrobe racks; and cellophane wrappers. Rep.: G. D. Empage.

Consolidated Lithographing Corp., Brooklyn, N. Y. Booth 143. Hosiery, underwear, bathing suits, corset, and sweater, box wraps, bands, and labels; window transparencies, decalcomanias and cut-out window and counter display signs. Rep.: R. D. Cohen, E. D. Weickert, H. A. Voice, J. G. Feldman, Jos. Feldman, B. M. Schonfeld, W. Greenwald.

Charles Cooper Co., Inc., Bennington, Vt. Booth 141. Knitting needles and fabrics knit on Cooper spring-needle rib machines. Rep.: J. S. Hayes, R. Rogers, G. E. Scott.

Cotton, Atlanta, Ga. Booths 364, 365. Textile publishers.

Cross Cotton Mills Co., Marion, N. C. Booth 14. Double-carded knitting yarns, 16s to 40s, natural, bleached, and dyed. Rep.: J. D. Cunningham, E. Cross.

J. D. Cunningham, Philadelphia. Booth 14. Same as Cross Cotton Mills Co.

Davison Publishing Co., New York. Booth 74. Textile publishers.

Paul Dietz, East Greenville, Pa. Booth 388. Same as Presto Box & Label Printer.

Dixie Mercerizing Co., Chattanooga, Tenn. Booths 135, 136. Mercerized yarns. Rep.: Geo. R. West, Jr., J. B. Frierson, E. R. Kimball, F. W. Frank, B. Pfingst, J. B Cameron, R. H Perkins, S. L. Diggle, F. Lemmond.

Dubied Machinery Co., New York. Booths 194, 195. Automatic power machines running on fabrics of interest to outerwear, bathing suit, and underwear manufacturers. Featuring an extensive collection of latest Paris fashion fabrics in new stitch combinations. Rep.: E. O. Spindler, D. J. Werfelman.

Duffy Silk Co., Buffalo, N. Y. Booth 151. Thrown silk on cone and in skeins and blackboards exhibiting raw silk. Rep.: T. Hemmerich, C. W. Seidel.

John **Dunlop's Sons, Inc.,** New York, Booth 335. Space to be used as a reception room. Rep.: D. L. Ryan.

Duplan Silk Corp., New York. Booths 245, 246. Space to be used as a reception room. Rep.: Geo. Friedlander, H. H. Cannon, W. S. Wheeler, Jr., O. H. Haas, G. E. Ward.

DuPont **Rayon Co.,** New York. Booths 149, 150, 173, 174. Garments and fabrics made of DuPont Rayon. Rep.: C. G. Hookey in charge.

Commercial Museum, Philadelphia, Scene of Knitting Show from April 11 to April 15

Durene Association of America, New York. Booths 196, 223. Durene knitted underwear for men, women, and children; outerwear; knitted outerwear; fabrics; hosiery for men, women, and children; shoes, gloves, and handbags; laces, embroideries, foundation garments, girdles, and brassieres. Featuring new uses for yarns, including outerwear fabrics, made on machines originally designed for underwear, diagonal-rib corduroy types and fancy mesh fabrics; women's sheer underwear and children's knitted socks. Rep.: E. L. Starr, Misses G. Walton, K. Day, E. Lou Fetta.

Eclipse Textile Devices, Inc., Elmira, N. Y. Booths 328, 329. VanNess single-color random dyeing machines; Eclipse automatic yarn cleaner, slub catcher, and bobbin holder. Exhibiting knitted and woven fabrics made from multi-colored yarns. Rep.: J. C. Ferguson, J. P. Garey, J. D. Lutes, L. A. Uttrich.

Everlastik, Inc., Chelsea, Mass. Booth 345. Elastic webbing, showing its application to knitted products and other items of wearing apparel. Featuring 1-in. elastic webbing called Fashionlastik and its use as a waist band for the new tuck-stitch undergarments for women and children; elastic webbing applied to women's full-fashioned hosiery, boys' golf hose and children's half hose; elastic webbing for men's underwear. Rep.: R. A. Parker, W. H. Johnson, W. E. Dalby.

Ewing-Thomas Corp., Chester, Pa. Booths 18, 19. Space to be used as a reception room. Rep.: S. M. D. Clapper, M. Ewing, D. Thomas.

Fairchild Publications, New York. Booths 383, 384, 421, 422. Textile publishers.

W. F. Fancourt & Co., Inc., Philadelphia. Booth 140. Textile soaps, oils, and specialties. Featuring products for dyeing, degumming, delustering, and for conditioning rayon, silk, etc. Emphasizing also a compound scientifically formulated for delustering silk and rayon hosiery. Rep.: W. F. Fancourt, Jr., E. H. Morningstar, C. T. Harvey.

Fidelity Machine Co., Philadelphia. Booths 137, 138, 139, 184, 185, 186. Universal ribber equipped with four-color yarn selector and knot tyer; multi-step bird's-eye mesh ribber equipped with 25-step patterning mechanism, picot edge, plaiting, and four-color yarn selector and knot tyer; multi-design sinker, top machine; universal ribber equipped with five-color yarn selector and knot tyer and picot edge attachment; universal ribber equipped with two-color yarn changer; universal French-weld ribber equipped with plaiting attachment; universal selvage welt ribber; three-speed special high-speed tubing ribber; 16-carrier No. 1 fish-line braider; steam-heated steam jet creasing machine; and accessories for seamless and full-fashioned industries. Rep.: H. W. Anderson, W. Larkin, E. A. Cordin, A. B. Davis, S. B. Blaisdell, G. Petrie.

J. A. Firsching, Utica, N. Y. Booths 401, 404. Cutting machines; porous-knit attachment; cut presses and spring brackets for spring-needle machines. Featuring an improved cutting machine with winding-up device which enables winding of all types of fabrics and having a quick-change measuring device which increases production. Also emphasizing a 36-gauge porous-knit attachment with combination flat presser and print presser with pivoted bearings. Rep.: J. A. Firsching, J. A. Firsching, Jr., R. A. Firsching.

Fletcher Works, Inc., Philadelphia. Booths 120, 121. Featuring new model 33 twister with unit control; independently driven upper and lower deck, large-diameter idler pulleys, take-up rolls driven through spindle belt, and endless lapless belts. Emphasizing also the Duplex double twister in operation; a double-deck redraw frame in operation with a variety of take-up spindles to accommodate different bobbins; and a 30-in. Junior extractor with glass, smooth monel metal baskets and automatic timing device. Rep.: O. W. Schaum, R. J. Bartholomew, C. Wm. Schaum, W. H. Rometsch, Jr., C. W. Moore.

J. B. Ford Co., Wyandotte, Mich. Booth 285. Special textile products for use in dyeing, bleaching and scouring silk, wool, cotton, and rayon fabrics. Rep.: S. S. Klebart, J. F. Flaherty, J. W. Turner, H. Moyer.

Foster Machine Co., Westfield, Mass. Booths 197, 222. Model 75 precise-wind cone winders for rayon and silk.

Featuring interchangeable parts and accessories for adapting the machine to different materials and to provide flexibility. Rep.: T. E. Connor, D. W. Bridgman, J. E. Wood, and others.

Franklin Needle Co., Franklin, N. H. Booth 124. Latch needles, sinkers, jacks, and points. Rep.: G. L. Hancock, J. A. Eberly, V. L. Eshelman, G. MacFadyen.

General Electric Co., Schenectady, N. Y. Booths 266, 267. Featuring small switches and pushbuttons. Demonstrating and exhibiting representative plastic products. Rep.: W. A. Gluesing, in charge.

General Electric Vapor Lamp Co., Hoboken, N. J. Booths 248, 249. Display of modern lighting equipment for up-to-date knitting mills. Featuring Cooper-Hewitt industrial lighting. Displaying also a new Cooper-Hewitt industrial lamp incorporating the latest developments, both mechanically and electrically. Rep.: C. F. Strebig, D. R. Grandy, L. F. Gerisch, W. R. Flounders, R. B. Chipman, Jr.

Grand Rapids Textile Machinery Co., Grand Rapids, Mich. Booths 105, 117. Dyeing, drying and finishing machinery for tubular knit fabrics. Featuring an advanced upright finishing machine of new design throughout and giving flexibility in finishing. Rep.: H. A. Shields, A. W. Shields, W. H. Shields, A. Stormzand.

Grosser Knitting Machine Co., New York. Booths 298, 299. Space to be used as a reception booth. Featuring samples of fabrics knit on latest types of full-fashioned machines. Rep.: M. Nydegger, O. Custer, R. Winkler.

Grove Silk Co., Dunmore, Pa. Booth 72. Exhibiting silk hosiery and showing effect in finished fabric of mixing in the same stocking silk having different natures. Rep.: G. J. Schautz, A. G. Schautz, G. J. Schautz, Jr., W. T. Cheatham.

Hampton Co., Easthampton, Mass. Booths 274, 275. Space to be used as a reception room. Rep.: F. B. Handy, B. H. Rehbaum, J. R. Moore, R. B. Lake, Wm. P. McCulloch, F. W. Kingsley, R. B. King, J. S. Blodgett.

Hampton Textiles, Inc, Gastonia, N. C. Booths 182, 183. Same as Textiles, Inc.

Oscar Heineman Corp., Chicago. Booths 378, 379. Space to be used as a reception room. Rep.: A. Lindenberg, L. Wotan, C. D. Gott, T. Cowan, N. P. Murphy, E. F. Golden.

Hellwig Silk Dyeing Co., Philadelphia. Booth 125. Samples of resist and regular dyed weighted and unweighted silk, rayon, and novelty fibers. Samples made from these yarns and weighted, dyed, and finished fabrics. Rep.: Wm. J. Gutekunst, R. M. Gutekunst, H. C. Gutekunst, G. Smith.

Hemphill Co., Pawtucket, R. I. Booths 212, 214, 253, 255. Featuring seamless hosiery knitting machines for half hose, golf hose, women's hose, and children's. Equipment includes two Banner full-automatic wrap-stripe machines with 18 color feeds and 14 steps, one knitting 240-needle pure-silk ingrain hose on true wrap stripe, and the other knitting wool half hose; new mock-wrap machine knitting wool half hose; an improved Banner split-foot machine knitting half hose; two rib machines, one a new Banner automatic true-rib half-hose machine with French welt and twelve-step reverse plating, and the other a Spiers ribber knitting 6 x 3 plated hose. Other equipment comprises two Banner twelve-step reverse-plating machines; new single-top machine; three Banner machines for children's hosiery, one knitting on a 13-step mesh in combination with 12-step reverse plating and rib top; another knitting 2-in. 13-step mesh with rib top, and the third knitting infants' rib hose, size 4. Rep.: J. Lawson, R. Lawson, L. B. Wilcox, J. McDowell, Geo. McDowell, H. G. Gross, H. B. Carico, R. Quinlan, H. W. Kettlety, A. Pelky, and others.

John W. Hepworth & Co., Inc., Philadelphia. Booth 167. Hosiery looping machines in operation. Rep.: Geo. Keyser, J. Sander.

Louis Hirsch Textile Machines, Inc., New York. Booths 95, 96, 126, 127. Space will be used as a reception room. Rep.: L. Hirsch, A. Friedmann, G. A. Urlaub.

Alfred Hofmann, Inc., West New York, N. J. Booths 188, 189, 230, 231. Space to be used as a reception room. Rep.: A. Hofmann, C. E. Weinberg, E. A. Fuestel.

E. F. Houghton & Co., Philadelphia, Pa. Booths 308, 308AA, 309, 309AA. Processing and lubricating materials for the knitting industry, including Golden Wonder powder for scouring and boiling off of knit goods, a new product for perfuming hosiery, and a new boil-off oil for use in either the one-bath or two-bath method of dyeing hosiery. Displaying also a new drive known as the Vim Efficiency drive for textile machinery, and an acid-resisting coating employed for lining tanks or as a protective coating for walls, girders, etc. Rep.: H. C. Roberts, K. A. Newman, V. W. Wells, G. S. Rogers, C. G. Schultze, W. A. Buechner, J H. Young, A. B. Myler, C. A. Stonerod, R. F. Smith, B. A. Burke, R. K. Gurney, H. J. Waldron, R. J. Maxwell, J. E. Davidson, J. A. Brittain.

Howes Publishing Co., New York. Booths 103, 104, 118, 119. Textile publishers.

Industrial Rayon Corp., Cleveland, Ohio. Booths 178, 179. Premier rayon and Spun-lo rayon and products made from these yarns. Rep.: L. A. Wolin, A. A. Murphy, Geo. Brooks, E. W. Knapp, F. E. Belden.

International Nickel Co., New York. Booths 76, 77. Exhibiting uses of Monel metal for dyeing rayon, silk, and cotton —covering package, skein, hosiery, and knit goods dyeing. Display of Monel metal accessories including seamless utensils, dye sticks, scoops, measures, reels, perforated spindles, moistening boxes, and emulsion troughs. Stressing the quick color changes made possible through the use of Monel metal equipment. Rep.: E. A. Turner, C. J. Bianowicz.

International Printing Co., Indianapolis, Ind. Booths 12, 13. Boxes manufactured for hosiery, knit goods, bathing suits, sweaters, sport coats, comforts, blankets, etc. Boxes are printed, cut, and scored at factory, and shipped knocked down flat to the mill. Demonstrations of simplified Rotoez box make-up machine and Rector bench-type power gluer. Rep.: E. A. Hunt, J. J. Hess, G. E. Hunt, P. L. Watkins.

International Salt Co., Inc., Scranton, Pa. Booth 67. Commercial salt, rock and evaporated. Featuring Retsof rock salt dissolver used for producing clear brine for regenerating water-softening equipment. Rep.: A. J. Hulsebosch, P. S. Walter.

Loyal T. Ives Co., New Brunswick, N. J. Booth 156. Various types of spring-beard needles, sinkers, jacks, and other special parts used in knitting machines. Rep.: T. Whitlock, E. A. Quint, Wm. W. Heath, H. W. Thomas, R. Bergen.

Jacquard Knitting Machine Co., Inc., Philadelphia. Booths 222, 223, 292, 293. Circular jacquard ribbers, Racard type in B and C models, making 2/2, 2/1, etc., bottoms with racked self edge and draw thread. Features of machines include individual control of all cams and yarn fingers, as well as control of colors; two shears on yarn stripers; two-speed drives; make twill or birdseye backs. Model B is complete with jacquard mechanism, while model C is for the fast production of plain fabric, 2/2, 2/1, etc., bottoms with racked self edge and draw thread with the introduction of multi-colored stripes. Rep.: H. Albertman, J. Shaw, A. Kreiner.

E. W. S. Jasper, New York. Booth 391. Spring-beard and latch needles manufactured by Ernst-Beckert and Theodor Groz & Soehne. Rep.: E. W. S. Jasper, E. L. Jasper, O. Buehler.

Jefferson Island Salt Co., Louisville, Ky. Booth 99. Salt. Rep.: H. S. Elliott, T. T. Meyer.

Visit Us at Philadelphia

TEXTILE WORLD'S *headquarters at the Knitting Arts Exhibition at the Philadelphia Commercial Museum, Monday to Friday (Apr. 11 to 15, inclusive), will be located in booths 269 and 270. Representatives of both editorial and business staffs will be in daily attendance.*

Johnston **Mills Co.,** Philadelphia. Booth 229. Durene, combed and carded cotton yarns. Featuring Durene mock-twist heather and colored yarns. Rep.: J. W. Ferguson, W. W. Peters, F. N. Belk, Wm. J. Yates, R. M. Bechtel, J. S. Wilcox, R. H. Johnston, F M. Shannonhouse.

W. H. & F. Jordan Jr. Mfg. Co., Philadelphia. Booth 98. Textile oils and specialties. Featuring Seronex, a soap in liquid form. Rep.: C. Jordan, H. B. Dohner, R. A. Bruce, G. C. Harkins.

Kahn & Feldman, Inc., New York. Booth 10. Thrown silk. Rep.: R. A. Adams, M. Feldman, J. O'Donoghue, C. W. Seidel, R. A. Newmark.

Kali Mfg. Co., Philadelphia. Booths 180, 181. Oils for silk soaking, rayon oils, and special oils for treating delustered rayon. Improved types of boil-off oils, delusterants, and special finishes for hosiery. Kali chlorine neutralizer for the bleacher. Fabrics on which these various products have been used. Rep.: E. G. Davenport, J. A. Branegan, E. W. Wall, J. J. Donlen, C. Slayton, J. Leaper.

Kaumagraph Co., New York. Booths 162, 163, 208, 209. Transfers for trademarking, decorating, and identifying textiles; embossed seals, box racks, and other packing accessories. Berks transfer stamping irons; transfer roll holders; and Transol Kaumagraph solvent. Rep.: H. A. Keech, A. D. Crawford, D. Blevins, N. E. Griffith, G. M. Porges.

Knit Goods Publishing Corp., New York. Booths 112, 113, 160, 161. Textile publishers.

Laconia Needle Co., Laconia, N. H. Booth 221. Latch needles in both screw-rivet and rivetless types. Rep.: A. B. Sanborn, H. D. Sanborn, C. B. Paulus, W. H. Groat.

R. K. Laros Silk Co., Bethlehem, Pa. Booths 359, 402. Silk hosiery yarns. Rep.: R. K. Laros, T. H. Mueller, and representatives of sales force.

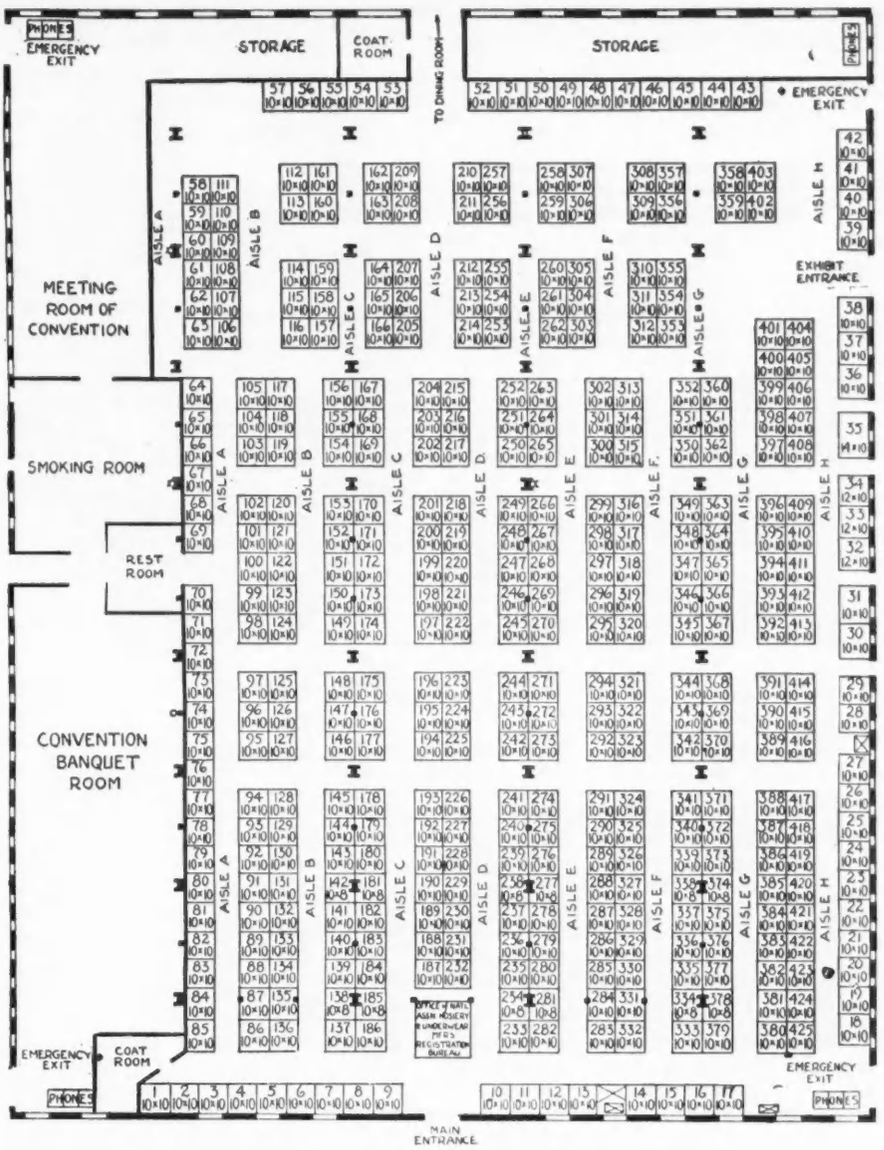
Oswald Lever Co., Inc., Philadelphia. Booth 397. Samples of products wound on cones, tubes, etc. Fiber-head spools and bobbins. Rep.: W. T. Joyce, J. D. Joyce.

C. R. McGinnes, Reading, Pa. Booth 276. Representing W. F. Hofford, Inc.; Ruby Cotton Mills, Inc.; Ranlo Mfg. Co.; Green River Mfg. Co., Ingram Mfg. Co. Space to be used as a reception room. Rep.: C. R. McGinnes, D. V. Smith, W. F. Hofford, T. L. Wilson.

W. A. P. MacKnight, Philadelphia. Booth 286. Space to be used as a reception room. Rep.: M. P. Glynn, Jr., Wm. A. P. MacKnight, C. J. Swift, A. E. Davis.

Malina Co., Inc., New York. Booths 346, 347. Natural and dyed yarn including rayons, worsteds, zephyrs, and novelty types. Rep.: L. Malina, I. J. Aibel.

Markem **Machine Co.,** Keene, N. H. Booths 247, 268. Label, box, and sticker high-speed printing machinery used by hosiery, underwear, and yarn mills for placing marks of identification on labels, boxes, rider tickets, cone stickers, etc. Featuring Model 1,000 heavy-duty King machine for application of marks of identification to unusual materials which ordinarily are difficult to mark. Machine will be in operation at speeds in excess of 200 imprints per minute and will be equipped with a heated printing head for gold, silver, and metal-colored printing compounds. Rep.: C. A. Putnam, C. E. Putnam.



Floor plan of Commercial Museum, Philadelphia, showing booth arrangement for Knitting Arts Exhibition

Merkel Bobbin Co., Allentown, Pa. Booth 122. Featuring metal-head take-up bobbins; variable-weight take-up bobbins, steaming bobbins, and armored Bakelite-head take-up bobbins. Rep.: W. E. Kiefer, J. Kiefer.

Merrow Machine Co., Hartford, Conn. Booths 339, 373. Merrow high-speed machines for trimming and overseaming, blind-stitch hemming, plain and ornamental edge finishing. Rep.: Philadelphia distributors in charge.

Clarence L. Meyers, Inc., Philadelphia. Booths 154, 155, 168, 169. Durene silk tram, combed cotton, carded cotton, merino, spun rayon, novelty twisted yarns and fabrics made therefrom. Featuring a new mixed yarn which has not been shown previously. Rep.: C. L. Meyers, M. M. Meyers, M. Meyers, G. C. Ballenberg, G. E. Maurer, H. Schraeder, Chas. Bender, E. W. Fowler.

James E. Mitchell Co., Philadelphia. Booth 327. Cotton and rayon yarns in cones, tubes, and skeins. Rep.: J. J. Mitchell, Jr., J. A. Hayes, Jr., R. H. Smith, C. L. Smith, R. Whitaker, F. W. Sundberg, A. W. Morton, Jr., W. J. O'Neill, B. G. Murray.

Melliand Textile Monthly, New York. Booth 89. Textile publishers.

L. P. Muller & Co., Philadelphia. Booth 132. Cotton knitting yarns carded and combed; natural and dyed. Rep.: Thos. Nicholson, E. Muller, J. L. Muller, Thos. P. Cummings, A. M. Shaw, H. Harper, Thos. Brown, Jas. T. Miller.

National Association of Hosiery & Underwear Manufacturers, U. S. Bureau of Standards, Washington, D. C. Booths 43, 46, 47, 52. Panel showing research work conducted by association. Rep.: E. M. Schenke.

Nyanza Mills, Woonsocket, R. I. Booths 130, 131. Fabrics, underwear, and hosiery manufactured from Nyanza spun rayon, worsted, and combination yarns. Featuring zephyr worsteds, kid mohair, and rayon combination yarns. Rep.: F. W. Boyd, J. G. Oswald, V. D. Milliken, N. F. Ayer, Miss M. Lord.

Paramount Textile Machinery Co., Chicago. Booths 146, 147, 148, 175, 176, 177. Hosiery drying forms operated by steam or hot water, looper attachment, inspection machines, device for inserting tissues in stockings. Rep.: H. Pope, L. H. Oswald, T. W. Prosser, G. C. Kautz, L. F. Kleinfeld, J. J. Biselx, T. K. Long, O. A. Siegel, W. L. Coggins, W. H. Albertson.

Parks-Cramer Co., Fitchburg, Mass. Booths 91, 92. Working model of a central-station air-conditioning system demonstrating the function of this system under full automatic control. Other types of equipment in operation to show systems installed in circular knit mills. Rep.: H. B. Rogers, L. F. Ross, R. E. Dorr.

Payson Yarn Co., Inc., New York. Booth 198. Rayon yarns. Rep.: J. J. Payson, C. M. Payson, J. J. Nevins.

Penn Worsted Co., Philadelphia. Booth 97. Space to be used as a reception room. Rep.: W. T. Porter.

Permutit Co., New York. Booths 101, 102. Commercialized water softener with section cut out to display interior construction. Small softener finding use in textile mills for special uses. Electrochemical feeding device in operation, illustrating how various chemicals can be fed exactly in proportion to the flow of water. Control box for continuous boiler blow-off equipment. Model of a heat exchanger. Rep.: M. F. Corin, W. H. Mitchell, D. J. Hess, W. L. Lowrie, G. A. Weinhold.

Geo. B. Pfingst, Inc., Philadelphia. Booth 155. Japan hosiery tram for the seamless and full-fashioned trade. Rep.: G. B. Pfingst, J. J. Jacobs, J. P. Reynolds, C. C. Harding.

Philadelphia Drying Machinery Co., Philadelphia. Booths 224, 225. Electric and steam heating hosiery drying forms. Illustrations of hurricane dryers for raw stock, skeins, packages, warps; drying and finishing equipment for silk, rayon, cotton, and woolen piece goods; vacuum extractors; and tenter dryers. Samples of products dried and finished on equipment manufactured by this company. Rep.: T. Allsop, W. W. Sibson, C. H. Ruemann, H. O. Kaufmann, and W. W. Sibson, Jr.

Chester I. Campbell, Director, Knitting Arts Exposition

Philadelphia Metal Drying Form Co., Philadelphia. Booths 295, 296. Hosiery drying forms of various shapes and styles in steam and electric models. Adjustoe attachments. A new machine for inserting tissue paper in chiffon and lace hosiery. Rep.: P. Guggenheim, J. Seligman, G. W. Morton.

Pioneer Salt Co., Philadelphia. Booth 99. Same as Jefferson Island Salt Co.

Presto Box & Label Printer, East Greenville, Pa. Booth 388. Box and label printing machines. Emphasizing the Presto change wheel which makes it unnecessary to reset type when changing style, size, or quantity. Rep.: R. A. West, O. B. Meyers.

Proctor & Schwartz, Inc., Philadelphia. Booths Block of four spaces at entrance. Demonstration of automatic hosiery boarding, drying, and stripping machine. Emphasizing adaptability of this method of boarding to mesh and lace hosiery, as well as other novelty numbers in modern style trends. Rep.: C. T. Griffith, Chas. S. Tiers, H. B. Lex, Wm. J. Merrigan, Jr.

Queens Machine Corp., Brooklyn, N. Y. Booth 68. Link-and-link knitting machine and a small circular machine. Featuring an improved 7-gauge, 62-in. fully automatic link-and-link machine in operation. Rep.: M. Zimitz.

Rayon Publishing Corp., New York. Booths 2, 3. Textile publishers.

Reece Button Hole Machine Co., Boston. Booths 348, 349. Button-hole machines in operation. Featuring the new Series 101 cord and thread trimming machine. Rep.: J. Pikul, E. W. Taylor.

Robert Reiner, Inc., Weehawken, N. J. Booths 380, 381, 424, 425. Plain and fancy full-fashioned hosiery made on regular leggers and footers and same line made on Model 3T single-operation machines. Photographs of equipment and attachments for knitting mesh and lace hosiery. Rep.: Dr. R. Reiner, R. Wagner.

J. E. Rhoads & Sons, Philadelphia. Booth 417. Beltings. Featuring a small belt-testing machine which shows the comparative tension required with various types of belting to transmit a definite horsepower. Featuring also spindle beltings, universal winder belting, special belting for knitting machines and for loose coarsing fabric, and round belting for sewing machines. Rep.: W. J. Coppock, L. H. Schoebel.

L. Robaczynski, Brooklyn, N. Y. Booths 375, 376. Link-and-link knitting machine with combination double rack with a new counter which counts by dozens and pieces. Rep.: L. Robaczynski, E. Mason.

Rose Mills, Inc., Philadelphia. Booths 336, 337. Novelty yarns.

Royersford Needle Works, Inc., Royersford, Pa. Booths 336, 337. Springbeard needles, points, hooks, and other full-fashioned machinery parts in novel exhibition cases. Rep.: F. Heller, R. Briedenbach.

San-Knit-ary Textiles Mills, Philadelphia. Booth 11. Knit bags for dyeing and bleaching hosiery. Rep.: S. Friedberger in charge.

Scholler Bros., Inc., Philadelphia. Booths 128, 129. Soaps, softeners, specialties, and finishes for textiles; samples of fabrics treated therewith. Featuring Brosco dull finish; Brosco finishing compound SP; and Brosco scroop oil. Rep.: M. C. Scholler, J. F. Noble, G. Pickering, A. J. Ganster.

Harry Schwartz, Brooklyn, N. Y. Booth 372. Novelty yarns, rayon twists, etc. Rep.: D. D. Schwartz, H. Schwartz.

Scott & Williams, Inc., New York. Booths 260, 261, 262, 303, 304, 305. Circular knitting machines for manufacturing women's hosiery, men's and infants' half hosiery, and underwear fabrics. Hosiery machines include gusset-toe. K spiral machine in popular gauges for manufacture of net and fancy lace hosiery. Full range of 25-step spiral half-hosiery machines; HH 25-step spiral machines in small diameters for infants' fancy socks; E. S. embroidered-stitch machines for wrap-type half hose for men. Circular machines for knitting various types of underwear fabrics of extreme fineness and with novel stitch effects.

Sees & Faber Co., Inc., Philadelphia. Booths 78, 79. Factory supplies and knitters' tools. Featuring rubber fabric round belts and improved eyelet strapping machines. Rep.: R. W. Sees, H. Schwarz, J. Dietrick, C. D. Ambler, H. Beetle, E. C. Buckley.

Singer Sewing Machine Co., New York. Booths 202, 203, 204, 215, 216, 217. High-speed machines for manufacturing rayon and knitted garments, featuring new 81 Class overedging machine operating at maximum speed of 5,000 stitches per minute. A working exhibit will be conducted for the benefit of those in attendance, and experienced operators will be employed in making up women's rayon garments.

Smith Drum & Co., Philadelphia. Booths 4, 5, 6, 7, 8, 9. Hosiery dyeing machine, inspection forms, double-sole thread cutters, skein dyeing machines. Featuring skein dyeing machines for application of vat colors and for handling finer counts of yarn, as well as specialty yarns. Rep.: H. S. Drum, N. Smith, W. C. Dodson, C. A. Sauerbrey, R. D. Howerton.

Southern Textile Bulletin, Charlotte, N. C. Booth 80. Textile publishers.

Southern Textile Machinery Co., Inc., Paducah, Ky. Booths 351, 352, 360, 361. Wright and Sotco steady dial loopers. Featuring looping attachments and accessories. Rep.: J. T. Balthasar, R. N. Parkin.

Earl M. Spencer, Philadelphia. Booth 377. Representing Valdese Mfg. Co. and Sellers Mfg. Co. Cotton and mercerized yarns, natural and dyed, 12s to 30s. Carded knitting yarns; combed knitting yarns. Rep.: F. Garrou, B. E. Jordan, E. M. Spencer.

Standard-Coosa-Thatcher Co., Philadelphia. Booths 287, 288. Space to be used as a reception room. Rep.: J. S. Verlenden, R. J. Mathewson, W. H. Thatcher, W. S. Lawson, J. P. Rickman, C. F. Smith, M. A. Henderson, Wm. M. Hall, E. R. Dillmore.

Standard Trump Bros. Machine Co., New York. Booths 199, 200, 201, 218, 219, 220. Seamless hosiery machines and attachments. Display includes six Model H machines equipped with latest attachments, two set up for manufacture of men's half hose, two for manufacture of infants' hose, and two for manufacture of children's hose. Three Model L machines of individual-needle wrap type, with stationary cylinder and revolving cam cylinder for infants' socks, boys' golf hose, and men's half hose. Three Komet machines, made by Bentley Engineering Co., of the double-cylinder type for broad-rib hose, infants' hose, golf hose, and half hose.

A. M. Tenney Associates, Inc., New York. Booth 237. Acetate yarns manufactured by Tennessee Eastman Corp. Featuring knitting yarns of various deniers.

Textile American, Boston. Booths 297, 318. Textile publishers.

Textile Machine Works, Reading, Pa. Booths 233, 234, 235, 236, 279, 280, 281, 282. Space will be used as a reception room. Rep.: N. E. Richards, E. A. Shoemaker, G. Staude, R. W. Weaver, H. Printz.

Textile World, New York. Booths 269, 270. Textile publications, directories, catalogs, technical books, etc.

Textiles, Inc., Gastonia, N. C. Booths 182, 183. Cotton yarns, combed knitting yarns, mercerized yarns. Rep.: A. W. Latta, H. A. Florsheim.

Torrington Co., Torrington, Conn. Booths 210, 211. Latch and spring-beard knitting machine needles and sewing machine needles. Featuring Excelsior brand latch and spring-beard knitting machine needles and sewing machine needles, and re-needling of full-fashioned machines. Rep.: Messrs. Wiechardt, Sullivan, Warner, Blake, Thacker, Schick, Rowe, Ross.

Tubize Chatillon Corp., New York. Booths 170, 171, 172. Knitted fabrics, hosiery, and underwear made of Tubize yarns, including Chardonize, Chacelon and Sunbeam brands. Rep.: H. N. Cappel, L. F. Smith, E. H Bogardus, E. D. Bryan, O. J. Caron, E. W. Martin, J. R. Morton, C. D. Swartout.

Union Special Machine Co., Chicago, Ill. Booths 290, 291, 324, 325. Flat-bed sewing machine for facing and piping rayon undergarments, a two-needle light-duty machine, and a three-needle machine. A machine for seaming mesh knit hosiery and another for attaching circular tops to mesh knit hosiery. Machines for blind-stitch hemming; machine for double- and triple-stitch felling on knitted fabrics; seamer for full-fashioned chiffon and other fine gauge hosiery; equipment for hemming operations and attaching trunks to skirts of bathing suits; auto-lap machines; multiple-stitch, zig-zag machines for pointed picoetta edging; binding and piping machines; circular- and straight-knife cloth cutters; and electric drills. Rep.: T. S. Whitsel, J. L. Stengel, P. J. Steeper, G. C. Cooper, T. C. Wiebers, Geo. M. Ide, P. T. McLendon, Wm. Pfeiffer, J. A. Zimmer, L. F. McGwier, W. Price, Jr., W. E. Hand, H. K. Lanning, A. J. Brown, Wm. Denhom, Jr.

United Elastic Corp., Easthampton, Mass. Booth 371. Elastic and non-elastic braids, lacings, cords, etc.

U. S. Textile Machine Co., Scranton, Pa. Booths 385, 386, 387. Double-deck twister and doubler-twister in operation. Featuring doubler-twister driven without belts or idlers. Rep.: A. W. Thomas, P. J. Thomas, E. Townsend.

Universal Winding Co., Boston. Booths 114, 115, 116, 157, 158, 159. Winding machines adapted to handling of rayon and silk for use on knitting machines. Special machine equipped for automatically controlling the inspection of yarn so that whenever a knot or large section of the yarn reaches the top on the machine it automatically stops the machine leaving the imperfection directly in front of the operator. Rep.: F. J. Quinn, H. Armitage, C. H. Brown, and others.

Van Straaten & Havey, Inc., Philadelphia. Booths 133, 134. Raw and thrown silk. Rep.: A. Van Straaten, M. H. Smith, A. Rosenstrauch, H. T. Nekervis, C. L. Page, W. J. Westaway.

Veeder-Root, Inc., Hartford, Conn. Booth 153. Textile counters and knitting machine counters. Featuring full-fashioned hosiery machine counters. Rep.: J. H. Chaplin, A. E. Kallinich, R. H. James, W. A. Larson, C. S. Palmer, R. T. Brosius.

Viscose Co., New York City. Booths 240, 241. Space will be reserved as a reception room. Representatives from New York and various district offices will be in attendance.

S. Walter, Inc., Philadelphia. Booth 294. Wrapping paper, bags, and envelopes. Featuring tissue paper hosiery inserts for machine manufactured by Philadelphia Metal Drying Form Co. Rep.: E. S. Rains and others.

William Whitman Co., Inc., Boston. Booths 238, 239. Cotton, cotton-spun merino, worsted, worsted-merino, and spun-rayon yarns. Rep.: H. S. Hicks, H. C. Leswing, Geo. A. Young, W. C. Ballard, W. A. Fuller, R. J. Walsh, W. Strugnel.

Wildman Mfg. Co., Norristown, Pa. Booth 310, 311, 312, 353, 354, 355. Circular knitting machinery in operation. Rep.: K. Howie, F. E. Paul, and others.

Willcox & Gibbs Sewing Machine Co., New York. Booths 300, 301, 302, 313, 314, 315. Flatlock machine for seaming knit goods, rayon and athletic underwear and similar garments; Feldlock and Feldlock Dualfeed machines for lap-seam felling on shirts, pajamas, underwear, overalls, and work shirts. Latch-stitch, overlock and intermittent ruffling, chainstitch label, Cornely and Uniart embroidery machines. High-speed lock-stitch zig-zag machines; overlock seaming machines for net stockings; and flatlock three-needle machine. Rep.: G. M. Lewis, R. E. Thompson, A. E. Felby, T. Whittle, Mrs. McLoughlin and Miss Gundacker.

Jacques Wolf & Co., Passaic, N. J. Booths 393, 394. Special chemicals including Monopole oil, hydrosulphite, sulphonated castor oils, scouring agents and lubricants. Featuring newer developments in printing gums, waterproofing and delustering compounds, and sulphonated olive oil for finishing silk and rayon. Rep.: F. G. Henckel, Dr. A. Pfister, H. V. Pfister, G. J. Desmond, A. Pfister, Wm. Seltzer, M. F. Costello, C. J. Rahm, C. E. Wright, J. F. McDonagh, W. Deuble.

Thomas Wolstenholme Sons & Co., Inc., Philadelphia, Pa. Booths 340, 341. Space to be used as a reception room. Rep.: L. F. Schaeffer, F. S. Krecker, G. C. Zimmerman, N. Schwartz, L. F. Schaeffer, Jr., Wm. R. Rietheimer.

How to Reach the Show

THE Commercial Museum is located at 34th Street, south of Spruce, reached by street car routes 11, 13, 34 or 40. The exhibition will open at 2 p.m., Monday (Apr. 11) and on other days to and including Friday will be open from 10 a.m. to 10 p.m. Friday the exhibit will close at 5 p.m.

The Week in Textiles

as Reflected in This Issue

Cotton

For Better Card Rooms
Suggestions for successful management of a card room are always in order. They are here given by a practical man who touches on layout, maintenance and checking up on production. *(page 86)*

Georgia Men Meet
The Cotton Manufacturers Association of Georgia held their annual meeting at Atlanta, Ga., on April 5 and 6. N. E. Elsas elected president. *(page 92)*

C.T.I. Gains an Award
The Cotton-Textile Institute was awarded honorable mention in the annual competition under auspices of American Trade Association Executives for the association whose work through the year is considered most beneficial to public and industry. *(page 93)*

Further Curtailment Sought
Further efforts are on foot to achieve increased curtailment of print cloth production to stabilize the market at a time when buying is low. *(page 93)*

Cotton Weakens
Further liquidation in cotton in sympathy with the nervousness current this week in security and commodity markets brought declines. Rallies were short-lived. *(page 95)*

Yarns Stationary
Cotton yarns are stationary both as to business and prices. Bids are too low to gain spinners' acceptance and the trade is living from day to day on small, filling-in orders. *(page 95)*

Goods Were Quiet
Cotton goods were quiet this week. Prices remained nominally unchanged which indicates praiseworthy firmness. The trade generally is awaiting further developments in further curtailment plans which should act to establish the market's stability. *(page 95)*

Wool

Cross-Bred on Ring Frame
The abundance and low price of cross-bred wools have caused spinners and weavers to use this stock in place of merino wools. In spinning this stock it has been found that the ring frame—largely because of its high production—is particularly suitable. Adjustments of the frame necessary for the satisfactory spinning of this stock are described. *(page 87)*

Wool Leaders to Pool Ideas
Gathering of ideas as to the best way to attack the current problems of the wool industry is aim of trade-wide meeting to be held next Tuesday in New York. *(page 91)*

Raw Wool Sags
Further weakness developed in wool prices after continued neglect on the part of buyers. On the lower basis some business was done but before the middle of the week it seemed that the bargains had been cleaned up since there was more general refusal of low bids. There is an oversupply of delaine reported and no immediate outlet is in sight. *(page 95)*

Yarns Very Quiet
Quiet remains the by-word in worsted yarns. Sales are at lowest ebb for some time; prices are fairly steady. *(page 95)*

Fall Fabrics Slow
Fall fabrics move slowly; some mills hold back on announcing prices. Those quoting new low levels get little response. *(page 95)*

Knitting

Special Knit Goods Number
This issue of TEXTILE WORLD is a special knit goods number timed to coincide with Knit Goods Week in Philadelphia. The latest developments in merchandising and manufacturing in the various branches of the knitting industry are presented to readers.

Philadelphia Awaits Knitters
Philadelphia is ready to play host to thousands of knit goods manufacturers and others during "Knit Goods Week," April 11 to 15, of which chief events are Knitted Arts Exhibition and 28th annual convention of National Association of Hosiery & Underwear Manufacturers. *(page 48)* A complete guide to the exhibition is given with descriptions of exhibits, names of company representatives in attendance and a floor plan showing booth locations. *(page 78)*

Style and Cooperation
New and attractive things to offer to buyers and more effective cooperation within the industry are offered as keys to future growth of the knit goods trade. History of the industry shows that it

The Textile Outlook

THE fact that there is insufficient business to go around among textile mills so that each may operate full time makes it an act of self-preservation to cooperate in curtailing production. Reduced cotton spindleage per capita as compared with 10 years ago makes a good argument for those who reckon that the industry is not over-equipped. Yet even this reduced machinery cannot be fully engaged until broader distribution becomes possible. Cooperation will preserve the industry with a minimum of further hardship until general business improvement or filling of unavoidable needs brings the volume of goods orders back to something nearer the old normal. After the sails are trimmed the storm can do much less damage to the ship. As individual companies adjust themselves to current shrunken demand, a better spirit will prevail. Wool goods mills are making their fall offerings and meeting with scant encouragement—adequate curtailment is indicated if the market is to preserve stability. Silks are unsettled. Knit goods hold the center of the stage this week because of the convention and exhibition in Philadelphia. This branch of the industry is doing better than most others largely because of initiative in sales promotion.

had its birth in this country about 100 years ago and its real mechanical development came within the last 50 years. It is still young enough to learn. Sketches of its development in Pennsylvania and the South are given. *(pages 49, 50, 52, 74, 76)*

Hosiery Has Gone Mesh

From a technical standpoint the production of mesh and lace circular hosiery presents no particularly intricate problems. Hose of this type is expected to be favored for some time to come, but mills should watch their production volume nevertheless. In men's half hose, surprisingly perhaps, mesh designs are being widely accepted; and it is interesting to note the ingenious manner in which this product is made on automatic machines. Avoidance of loop distortion is important in knitting mesh fabric on full-fashioned machines. Trend to fine gauge is surveyed and single-unit full-fashioned hosiery status is analysed. *(pages 54, 57, 60, 62, 64, 65)*

Underwear Problems Working Out

The Swiss-rib fabric is returning to popularity in the underwear field. It should be noted that there is a distinction between regular 2x2 fabric and bona fide Swiss rib. Weighting of rayon underwear fabric continues in spite of the fact that its detrimental effects are realized. Controlled output helps to stabilize the underwear market. *(pages 66, 67, 68)*

Outerwear Seeks Selling Points

The vogue for mesh has made its influence felt in the outerwear field, where open-work designs are finding favor. Mesh-work designs are discussed in three principal classifications. New style developments are helping sales. Swimsuit makers are trying new things to offset the lagging tendency of trade. *(pages 69, 72, 73)*

Sewn Mesh Hosiery Firm

Despite expections to the contrary, sewn mesh hosiery prices continue firm, with most mills at capacity. *(page 95)*

Sub-Standard Underwear Weak

Current weakness in lightweight underwear prices appears to center on sub-standard merchandise. Quality lines steady. *(page 95)*

Weather Slows Outerwear

Backward weather conditions have slowed up demand for swimsuits and sweaters, and warm spell should bring quick improvement. *(page 95)*

Silk

Winder Traverse Motion

If the extent to which the winder traverse motion controls the quality and output of silk all along the line were generally realized, more attention would undoubtedly be given to it. Knowledge of the working principle and adjustments of the differential motion is particularly vital. *(page 88)*

Raw Silk Up, Then Down

A steadying of currency in Japan strengthened raw silk prices on both sides of Pacific, Monday, but market weakened later. *(page 95)*

Thrown Yarn Quiet

Thrown yarn is quiet, demand from weavers and knitters being limited to day-by-day business. *(page 95)*

Spinners Seek New Outlets

Facing a complete paralysis of normal markets, spun silk mills concentrate on developing new outlets. *(page 95)*

Print Shortage Coming?

Increased call for all prints, and very low stocks, encourage weavers to forecast shortage in early summer. *(page 95)*

A Gingham From Paris

Bonney

Ginghams show up in new Paris styles. Lyolene presents the above spring ensemble using blue and white gingham for puffed sleeve blouse.

Rayon

Weighting Underwear Fabrics

In spite of consumer resentment, in spite of trade-organization and trade-press proposals, and in spite of the general furor which it has created, the weighting of rayon underwear fabrics continues. Stretching, too, falls into the same classification—the purpose of both is to permit the sale of an inferior fabric or garment as one of a better grade. *(page 68)*

South Buys Rayon

Better demand from southern weavers helps to offset decline in demand for rayon yarn. *(page 95)*

Processing

Degumming and Dyeing Mesh

Except for the difficulty involved in causing the dyestuff to penetrate the knots and seams formed in mesh hosiery, the dyeing of these stockings is practically the same as for other types of silk stockings. Three different methods are described. *(page 56)*

Controlled Finishing

Controlled shrinkage of piece goods, chemical control of mercerizing and piece-dyeing with vat colors were discussed at the spring meeting of the Dyers-Bleachers-Finishers Section of the S.T.A. at Charlotte, N. C., on April 2. Paul F. Haddock, although prevented by illness from attending, was reelected chairman. *(page 90)*

The Business Outlook

THE second quarter began by establishing new lows in basic business indicators, security markets and commodity price levels. The automobile sales drive has not yet been reflected in expansion in steel production nor electric power output, while unseasonally declining merchandise carloadings and bank debits indicate further recession in retail trade. Building construction seems to be stabilizing at bare subsistence levels. Budget balancing has not proven as much of a blessing as was anticipated, and some of the taxes employed for the purpose have stimulated sabotage and short-selling in security markets. Extension of federal credit relief into the mortgage field and widespread forced sales of farm land, show the spread of deflation. Bank credit contraction continues despite increased liquidity. Reconstruction Corporation activity has reduced bank suspensions and individual hoarding, but increased bank hoarding. Federal Reserve pressure for credit expansion is still inoperative, and its powers under the Glass-Steagall bill are still unused. Unless an effective inflationary movement can be initiated some form of standstill on domestic debts seems inevitable. Cooperative efforts to prevent breakdown in Eastern Europe are hopeful.—*The Business Week.*

Good Practice and Bad in Cotton Carding

By Squire Blackshaw

THE successful management of a card room can be achieved only after years of study, observation, and practice. A sound knowledge of mechanics and human nature, coupled with a good judgment of the spinning qualities of various cottons and an all-round ability to promote machine efficiency and harmony among the help are essential qualifications for a successful cotton carder.

Revolutionary changes have taken place within recent years. The old-fashioned mixing bins have almost disappeared, leaving the picker room first in order of sequence and importance.

The layout of the hopper bale breakers should be arranged to give as much room as possible for the laying of the bales around the machines. Large mixings are preferable, as they give a better average blending of staple, and a more constant uniformity from one mixing to another. Large mixings also permit a longer exposure to the actual atmospheric conditions of the room. This gives any excess moisture the cotton may contain a better opportunity to dry out before it is placed on the feed lattice of the first machine. The result is that the actual opening and cleaning is more efficiently performed and a more uniform-hank lap is produced.

Present-day picker-room practice tends towards the elimination of the single finisher picker and the introduction of the single picking process. The lower costs in labor and machinery associated with single picking cannot be ignored in these days of strenuous competition. Therefore the principle of fewer and more efficient machines must be adopted here as elsewhere.

Batteries of Bale Breakers

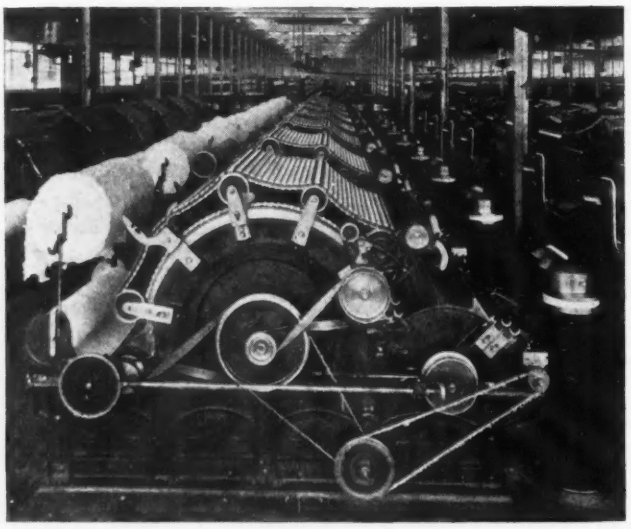
Cotton grown in the same field, or even on the same plant, varies in its chief characteristics. To achieve efficient mixing, each machine in the series must be arranged, set, and regulated so as to take full advantage of the provision made for the mixing of the various marks of bales being blended. Some mill managements prefer to install several bale breakers arranged on each side of the lattice leading to the hopper feeder. Each machine can then be set to suit the density of the bales being opened. The speed of each machine can also be regulated to give the required percentage of feed from any particular mark of bales. Where the above method is not in operation, the mixing suffers considerably owing to the fact that the hopper feeder exercises a decidedly discriminating action when an attempt is made to mix cottons of varying density, taking first the low-density cotton and leaving behind the more compact, high-density cotton, until by the constant rolling and combing action of the lattices and beaters it assumes a lighter and looser condition.

When the hopper feeder is fed by a single bale breaker or by a series of bale breakers, they should be regulated in speed so that a slight gain is obtained over the hopper feeder. By this means the hopper feed box is always kept well filled without the bale breakers idling for long periods, thus insuring the maximum amount of opening and cleaning. The same principle should be observed in all subsequent machines controlled by an automatic feeding motion. The evener rollers on all machines should be set close enough to the spiked elevating lattices to give a thin feed. This ensures a better opening effect and reduces the work of all subsequent machines.

In modern mills lap weighing has developed into a scientific operation, allowances being made in the weight of the laps to compensate for the relative humidity of the atmosphere in the room. Where special care is exercised in sizing the laps, uniform roving hanks and yarn counts can be produced without undue changing of the draft gears on the drawing frames.

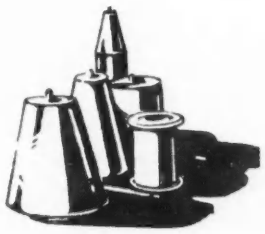
In carding, some overseers extract a certain percentage of waste as a matter of course, irrespective of the quality of cotton being carded. They assume that if the flats are coming from the cylinder well loaded with strips, efficient cleaning is taking place. This assumption is often a fallacy, for the flats are sometimes overloaded with long, serviceable fibers, while the short, useless ones pass forward to the doffer. The wide-awake overseer will examine and re-examine the strips from each card, and if they are too rich, will put the strip plate a little closer to the cylinder.

Stripping and grinding should be done at regular stated periods; slipshod methods will lead to trouble and loss. The setting of the flats and all other setting points should be in charge of an experienced card setter. Here, perhaps, more than anywhere else in the mill, irreparable and costly damage can be done through carelessness and inexperience. A book should be kept recording all important dates, such as when each card was reclothed, when the licker-ins were rewired, and when each card was ground and reset. The grinding rollers should be kept suitably covered with a good quality of emery fillet. The *(continued on page 92)*



Abundance of Cross-Bred Wool Favors Worsted Ring Frame

By Frederick B. Hudson



THE abundant supply of cheap, cross-bred wools has caused yarn spinners and cloth manufacturers to use this stock for goods which are usually made from merino wools. At the present time a 46s cross-bred wool can be obtained at about one third of the cost of a 64s quality and made into yarns at half the cost.

Cloth manufacturers have found that for many fabrics these wools can be made into very serviceable structures which compare most favorably with the purer types of merino. The counts required by weavers from these wools are 2/32s spun with eleven turns, and 2/24s with nine turns.

The hosiery trade also is accommodating itself to these yarns, and knitters are fashioning garments from medium cross-breds which have been made previously from botany wools. Much heavier counts are made for knitting than for weaving; this eliminates two drawing processes and enables the yarns to be spun with much less twist, thereby reducing labor costs and increasing production. Knitters favor 12s and 16s counts spun with four to six turns and plied into three-ply or four-ply yarns with three or four turns of twist.

In producing these yarns worsted spinners use the ring frame in preference to the flyer or cap types of spinning frames. More than twice the amount of yarn can be made on a ring frame than on a flyer frame in the same time, owing to the higher spindle speeds .

The cap frame, however, can be run at high speeds; but the centrifugal action frays the yarn and makes it very rough. Should the speed be reduced in order to diminish the roughness, difficulties will arise in winding-on; and the output will be reduced.

The ring frames employed for making these yarns should be built stronger than the type used for fine wools. The lower front rollers should have 4-in. diameters, and the pitch of the spindles should be 3½ in. Much larger bobbins can be used, and in view of the fact that there is little demand for single yarns of this type, double-headed bobbins can be employed for both weaving and knitting yarns. A 7x2 in. bobbin will hold 2 oz. of yarn and proves very serviceable in spinning and twisting.

In many cases these yarns are spun from the reducer sliver, which weighs five drams per 40 yd. for the 32s and fourteen drams per 40 yd. for the 12s. When very coarse yarns are being made, it is difficult for the operatives to make neat piecings, so it is a wise precaution to break out the roving when the spinning end comes down and "set in" anew at each doffing. Reducer bobbins are much larger than roving bobbins and need longer pegs to support them. It is not good practice to support a 12x6-in. bobbin on a 10-in. peg, because excessive tension is placed on the sliver, and undue stretching makes "twitty" places in the spun yarn.

The amount of draft given in the spinning of these yarns is about nine to ten. The ratch is adjusted to allow the fibers some freedom of movement, without releasing control. As a rule this should not exceed 9½ in. The amount of traversing given to the yarn guides should be reduced, because thick slivers tend to slip over the roller edges. In spinning a 50s quality wool, the amount of traverse is similar to a merino-wool traverse; but when a 46s wool is being spun it is advisable to reduce the traverse by about ⅛ in. at each side.

Carrier settings are made to accommodate the wools under treatment. The bottom carrier is placed as near as possible to the front roller, the second one at about 2½ in. from the front rollers, and the third one 3 in. from the second. Clean steel carriers and wood tumblers are essential when these yarns are being spun, because small pieces of fiber tend to run round them and detract the sliver. Carrier laps often are due to greasy, wooden top carriers. Should this fault become very troublesome, it may be necessary to dust the top carriers with French chalk to prevent formation of carrier laps.

Soft-covered pressing rollers are desirable when these yarns are being spun, to obtain a firm grip at the drafting point. The soft-covered rollers used in spinning luster wools have felt under-straps. These are not essential for a 46s quality, so the ordinary glued leather under-strap enclosed in a sewn top cover can be used. These rollers are known as "soft-covered on hard principle." The soft, top cover gives the grip, and the glued leather under-strap extends the life of the roller. The back rollers require a little more tension when spinning the coarser counts, so the pressing screw should be given one or two extra turns.

Many of the troubles which arise when cross-bred wools are being spun on ring frames are due to wrongly positioned yarn guides. The yarn should start ballooning exactly over the center of the ring in the lifter rail. This setting should not be made without the aid of a plumb-bob, as bad spins are found generally on those frames which have been set by guesswork and passed as "near enough." Improperly balanced balloons cause the yarn to chafe, fray, and break down.

The selection of travellers is very important when good results are required in spinning cross-bred wools to heavy counts, and the tendency is to err on the light side. A great danger to be avoided is grooved travellers, which are made by the constant rubbing of the wool. The best way of locating these is to feel the tension by hand and examine the travellers giving excessive drag.

Ear-shaped travellers give much better results than the small clip-on type in the spinning of coarse yarns because the yarn has more freedom of movement to accommodate the motion of the lifter. Also the tension placed on the traveller is more evenly distributed toward the point of winding-on which reduces the friction against the ring and enables it to run more smoothly.

Protecting Quality and Output Through

Silk-Winder Traverse

By L. L. Kingsford

THE importance of properly filled bobbins in silk winding cannot be overemphasized. Bobbins which are so built that the silk thread does not cover the entire drum will give trouble in unwinding, the end of silk becoming tangled in the hollow between the yarn package and the bobbin heads. Breakage occurs, knots are formed, waste is produced, and production and quality drop.

Inadequate movement of the traverse is responsible for this condition. Too extensive a movement of the bobbin traverse, on the other hand, will produce piling of the thread at the heads of the bobbins; and the results of piling are as bad as those of improper filling. Adjustment of the traverse, therefore, is a paramount factor in successful silk winding.

Fig. 1 shows the essential parts of the traverse motion. To avoid confusion, only the parts necessary for a clear understanding of the subject are given. Also, for clarity, some of the parts have been purposely sketched out of their true proportions.

The porcelain guide *PG* which guides the end of silk along the barrel of the bobbin *B* is attached to the bobbin traverse *BT*, which, in turn, is fastened to the bobbin traverse bracket *BTB*. The latter receives its motion from the lever *LV* through the medium of the adjusting bolt *AB*.

Different makes of winders have somewhat different shapes and arrangements of bobbin-traverse brackets, but the principle is the same. The level *LV* receives its to-and-fro movement from the traverse cam *TC* through the agency of the traverse-cam prism *TCP;* the spring *SP*, which is attached to both the frame *F* and the lever *LV* keeps the cam prism in contact with the cam.

Adjusting the Throw

Although the size of the cam itself primarily controls the throw or length of movement of the bobbin traverse *BT*, the fine adjustment required to insure perfect filling of the bobbin is entirely dependent on the manipulation of the adjusting bolt *AB*. Its position is the key to perfect building of the yarn or thread on the bobbin.

The lever *LV* is slotted at its upper end, and the bobbin-traverse bracket *BTB* is slotted almost its entire length, so that there is ample opportunity for obtaining any length of traverse for the gage of the frame. Since the lever is fulcrumed at *FC*, moving the adjusting bolt *AB* upward will increase the sweep and vice versa.

At this point a new factor must be introduced—the differential motion. This is an eccentric movement which expands and contracts the length of the bobbin-traverse movement approximately $\frac{1}{4}$ in. irrespective of where the adjustable bolt *AB* may be. Therefore, every alteration of the position of *AB* must be made with due regard for the effect of the differential.

The ensemble of the differential moton as it is depicted in Fig. 1 comprises the two gears *IG* and *OG* and the traverse cam *TC*, which is secured to the hub of *OG*. The space between the two gears has been purposely exaggerated in order to show more plainly the action of the eccentric movement.

On the outer side of the inner gear *IG* there is an eccentric cam *EC*. A lug *L* on one of the spokes of the outer gear *OG* contacts with the eccentric cam; and since the gear *OG* is free to move on the stud, it is susceptible of an axial movement equal to the difference between the thickest and the thinnest part of the eccentric cam *EC*.

For instance, let it be assumed for simplicity of illustration that the gear *OG* is kept from revolving but is, however, free to move back and forth on its stud; then, if the gears *OG* and *IG* are in the position shown in the sketch, a half revolution of *IG* would find the gear *OG* close to *IG*, whereas another one-half revolution of *IG* will push *OG* away to the position depicted in the sketch. The outward movement of the gear *OG* is effected by the action of the thick part of the eccentric cam *EC*, and the movement back to the gear *IG* is brought about by the pressure exerted by the traverse-cam prism *TCP*, on the cam *TC*.

The distance that the eccentric cam causes the bobbin traverse to move must always be reckoned with when the bolt *AB* on the lever *LV* is being adjusted. Once the correct adjustment of the bobbin traverse has been

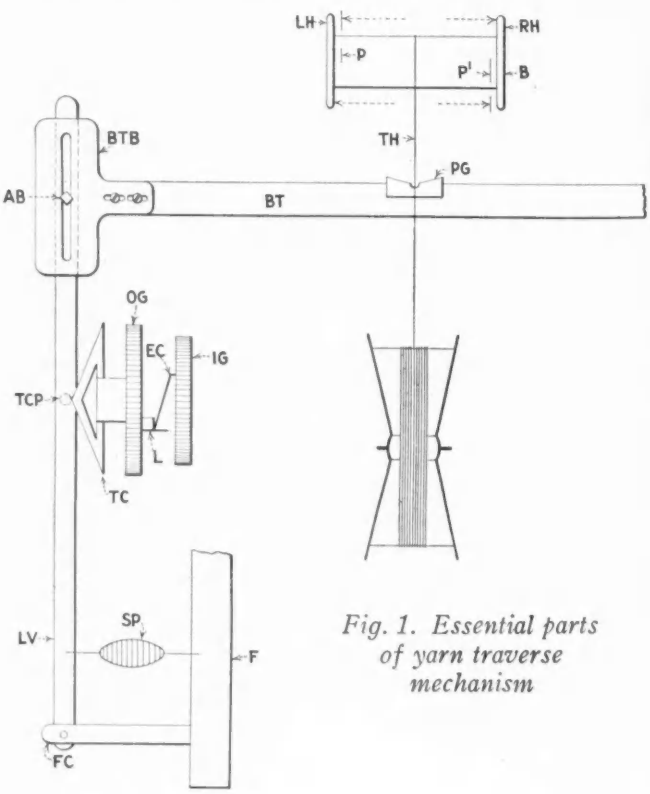


Fig. 1. Essential parts of yarn traverse mechanism

made, the effect of the action of the differential motion will be thus: Assume that the gears *OG* and *IG* are at the position shown in Fig. 1, that is, farthest apart, then the porcelain guide *PG* on the bobbin traverse *BT* should bring the thread as close to the left head *LH* of the bobbin *B* as experience has shown is necessary to build a good bobbin.

Now when the guide *PG* moves toward the right head *RH* of the bobbin, it does not journey the whole distance between the two heads but stops at a point *P'*, about $\frac{1}{8}$ in. from the right head. Gradually, however, as the position of the lug *L* changes with relation to the eccentric cam *EC*, the terminus of the guide *PG* recedes from the left head of the bobbin until finally, when the differential gear *OG* is at its nearest point to *IG*, the terminus will be at a point *P*, approximately $\frac{1}{8}$ in .from the left head; and the right terminus will have been changed from the position *P'* to a point as close to the right head *RH* as is practicable.

While the adjustment of the bobbin traverse is not necessarily a difficult one to the fixer who has studied the fundamentals of the differential motion, yet it is only by actual practice that one acquires the knack of making accurate adjustments rapidly. The ratio of the speed of the bobbin traverse to the speed of the bobbin has a bearing on the adjustment, but its effect can only be estimated arbitrarily through the trial and error method; in other words, the adjustment is first made, and tested out, whereupon a touch here and there will usually bring the desired results. The fixer will obtain good results if he makes the adjustment when the gear *OG* is either at its nearest or its farthest point from the gear *IG*.

The principle of the differential is not peculiar to the silk winder alone; it is used in winders for other textile fibers, although the method of obtaining the differential effect may vary in different makes. The frequency with which the end of silk is guided close to either head of the bobbin depends upon the difference in speed of the gears *OG* and *IG*. For example, if *IG* makes 30 r.p.m. and *OG* makes 27, the difference is three; and this is the number of times the gear *OG* would be forced away from and brought back to the gear *IG* in 1 min. Therefore the porcelain guide *PG* would carry the thread *TH* three times close to the left head of the bobbin *B*, and three times close to the right head during each minute.

Although, theoretically, the ratio of the speeds of the two gears *OG* and *IG* can be altered by changing the gears that drive them, probably few firms ever do make any changes. In any adjustment of the bobbin traverse care must be taken that the casting *BTB* does not bind; otherwise, the proper functioning of *BT* may be sufficiently disturbed to cause faulty building of the thread.

Another factor that may give trouble on some machines is a loose adjusting bolt *AB*. Faulty winding of the bobbins may have been observed, but the reason for it may not have immediately come to light, because the bolt, although loose enough to gradually slip out of place under the working strain, may not be sufficiently loose to attract attention when a search is made for the trouble. Often it is only by actually testing it with a wrench that its looseness is discovered. It is therefore advisable, when the reason for faulty building of the bobbins is not immediately apparent, to check up this bolt first.

◆

Single-Unit Full-Fashioned . . . *Present and Future*

(Continued from page 65)

controllable factors—and are controlled to a considerable degree by efficient mills through the proper routing of silk lots and the maintenance of uniform knitting conditions—we cannot let the possible reduction in seconds from this cause influence us too greatly. It must be remembered that while the single-unit machine is knitting a leg, it is not knitting a foot, and vice versa; therefore, in order to equal the output of the leggers and the footers on daytime production, it is necessary to have practically the same number of machines and knitters as formerly. Of course, with topping eliminated, it becomes possible to operate all the knitting machinery at night, thus reducing the number of machines required by those mills now operating the leggers at night, but not reducing the number of knitters. Although a reduction in the number of new machines on this basis might serve to reduce the amount of the initial investment, it must be remembered that single-unit equipment is more expensive per machine and that under any conditions an extensive installation calls for a staggering investment.

Little is left for us to figure on, therefore, but the saving in topping costs (assuming that unionized labor will not obstruct this saving), and from this must be deducted any part of the saving which is to be passed on to the customer. During the present vogue for mesh hosiery, topping is a more fussy operation than usual and a flagrant source of waste and seconds; but the vogue is temporary. The investment on new equipment, which is high, must therefore be divided by the share of the saving in topping costs which the mill expects to retain per month or per year in order that a rough idea may be had of the number of months or years required for that equipment to pay for itself *if* the stockings can be sold. It must be borne in mind that toppers' wages are now comparatively low, and that for single-unit work it is necessary to employ knitters of high efficiency, who are naturally high-wage earners.

To conclude, since the saving is relatively small and it is evident that if the buyers and consumers are to accept the single-unit hose, they must share in that saving, the full-fashioned industry will not find an investment in single-unit equipment sufficiently profitable to be attractive under present conditions—especially in view of the fact that much of the regular equipment now in operation has not been charged off. Present business conditions are likely to continue during the current mesh vogue, when the elimination of topping would be most advantageous. Uncertainty regarding the attitude of the consumer is at least a temporary stumbling block. On the other hand, the great interest which machinery builders are showing in the matter and the diligence with which they are applying themselves to the task of developing and improving single-unit equipment point to the eventual acceptance of some type of single-unit stocking. Probably the start will be made when some of the larger and better-known manufacturers are persuaded to make an installation, particularly those who sell direct to the consumer and are confronted with only one point of sales resistance. The time is simply not yet.

S. T. A. Meeting Discusses Modern Practice in

Dyeing, Mercerizing and Piece Goods Finishing

CONTROLLED shrinkage of piece goods, the problem of chemical control in mercerizing, and the piece dyeing of fabrics with vat colors were among the interesting subjects considered at the spring meeting of the Dyers-Bleachers-Finishers Section of the Southern Textile Association, held in Charlotte, N. C., April 2. Approximately 150 members and visitors attended the luncheon at the Hotel Charlotte and heard four technical papers presented. At the banquet Saturday evening, David Clark, editor of the *Southern Textile Bulletin*, Charlotte, was the principal speaker.

Paul F. Haddock, Charlotte, chairman of the section, was unable to preside at the meeting because of sudden illness. A. R. Thompson, Jr., superintendent of the North Carolina Finishing Co., Salisbury, N. C., acted as chairman at the afternoon session. John L. Crist, of the Calco Chemical Co., of Charlotte, was the toastmaster at the banquet.

Mayor Charles E. Lambeth, of Charlotte, delivered the address of welcome. H. H. Iler, of the Union Bleachery, Greenville, S. C., chairman of the board of governors of the association, responded to Mayor Lambeth's welcome. Walter C. Taylor, secretary of the association, introduced the guests at the banquet.

The background of the cotton textile industry's development in the United States was traced by Mr. Clark, beginning with the colonization of the land by the Scotch-Irish who had become experienced in weaving, and continuing down to the present time. The growth of cotton manufacturing in the South was described by the speaker, whose concluding remarks were as follows: "It is not my purpose to discuss here the causes for the decrease in New England spindles other than to state that unfavorable legislation and incessant strikes as the result of the activities of labor union leaders have been important factors.

"From the peak of approximately 39,000,000 in 1920 the total spindles in the United States mills have been reduced by dismantlement until we have now only 32,230,000 spindles, and during recent months we have been operating only about 25,000,000. When we had 39,000,000 spindles and were operating 34,000,000 of them, there were 105,000,000 people in the United States and now we have 123,000,000 population. In 1910 we were operating 307 spindles per 1,000 population, which increased to 335 in 1920. In 1932 we are operating only 200 spindles per 1,000 population, which is a remarkable shrinkage.

"The cotton manufacturing industry has been its own worst enemy and is responsible for the long period of small profits. Every time there has been a revival of demand and a short period of profitable prices, mills have neutralized the demand and prevented profits by promptly increasing production.

"We have now curtailed heavily for almost two years and stocks of goods have been reduced to the lowest point of recent years. I doubt, however, whether mill men have learned their lesson and would not be surprised to see the first advance in prices be the signal for again stepping production up to 9,000,000,000 spindle hours per month. The textile industry should, in my opinion, be the first to emerge from the depression. Its emergence will be permanent if mill men have learned their lesson and will in the future refrain from neutralizing every price advance with a quick expansion of production."

The first paper presented during the afternoon session was on "The Technical Nature of Starch and Dextrine," by George V. Caesar, research chemist, Stein, Hall & Co., New York, N. Y. Illustrations were projected on a screen to show comparisons between the various kinds of starches and their peculiar characteristics were discussed at length.

N. R. Vieira, of Charlotte, representative of the dyestuffs division of E. I. du Pont de Nemours & Co., delivered a paper on "Continuous Method of Piece Dyeing With Vat Colors," in the place of Lucius Collins, of the same company, who was not able to attend. Mr. Vieira discussed the advantages and limitations of continuous dyeing, and stressed the importance of the rereducing operation.

"Chemical Control in Mercerizing" was presented by B. F. Mitchell, general superintendent, American Yarn & Processing Co., Mount Holly, N. C. In his address, Mr. Mitchell described the methods employed to insure proper control of water, caustic solution, acid bath, etc.

The last paper, which discussed the practical aspects of the Sanforizing process, was presented by George P. Feindel, chemical engineer, of the Union Bleachery Greenville, S. C. Mr. Feindel first outlined the various methods used for preshrinking cotton fabrics, and then described in detail the construction and operation of Sanforizing equipment.

Paul F. Haddock, southern manager of A. Klipstein & Co., was re-elected chairman of the section. Mr. Haddock has held this position since the section was organized and has been largely responsible for the success of its meetings. Committees in charge of various features of the program were headed by the following: W. H. Willard, entertainment; T. A. Marlowe and D. C. Newman, finance; John L. Dabbs, dyestuffs and chemicals; Holstead Heap, bleaching and finishing; B. F. Mitchell, mercerizing; Malcolm McKenzie, dyeing; and Fred H. White, textile machinery.

Prizes awarded at the banquet were contributed by the following firms: Priscilla Mfg. Co., Barnhardt Bros.; Nebel Knitting Co., Inc., and the Celanese Corp. of America, all of Charlotte; North Carolina Finishing Co., Salisbury, N. C.; The Erwin Cotton Mills Co., West Durham, N. C.; and Ware Shoals (S. C.) Mfg. Co.

Aim of Next Week's Wool Industry Meeting

To Stimulate Cooperation

Franklin W. Hobbs, president, National Association of Wool Manufacturers, which is sponsoring the industry-wide get-together

NO DEFINITE plan of organization or action will be presented at the meeting of representatives of the entire wool industry, from growers through to garment makers, to be held in New York, April 12, according to Franklin W. Hobbs, president of the National Association of Wool Manufacturers which is sponsoring the gathering. Rather, it is hoped that the opportunity of talking things over will in itself bring out ideas that may be crystallized in action, and that a basis of cooperation will be laid for dealing with any industry-wide problems that may arise in the future.

In tracing the course of the movement, which led to the call for the meeting, Mr. Hobbs stated that several members of the National Association of Wool Manufacturers felt that there was need of some means by which the wool industry in general, embracing growers, dealers, spinners, weavers, knitters and garment makers could get together to discuss mutual problems. At the February meeting of the association the matter was referred to the executive committee, with the result that next week's meeting has been planned.

Whether a skeleton organization will be set up or any possible course of immediate action will be outlined, and whether the meeting will bring out the need for future action—all these points will depend entirely upon the views of those attending.

The wool goods industry in New York awaits the meeting with mixed feelings. It is assumed in the trade that the sponsors of the new body will move slowly, and such a policy would parallel sentiment among manufacturers generally. Inquiry among wool goods manufacturers indicated that they are gradually weakening in their resistance to cooperative effort; numerous companies which were cool to National Wool Week last year will be more responsive this year. Prospects for financial support are not too encouraging, but the outlook at that end may improve as the date for Wool Week approaches.

However, the industry is hesitant about backing a new organization, as there is considerable prejudice against the association idea. Trade comment indicates that the new movement will succeed with weavers proportionately as it puts the least stress on the aim of forming an association.

Current opinion is encouraging as regards National Wool Week. The wool goods industry is now in a mood where it might look sympathetically to the idea of making National Wool Week a permanent unit; or to other cautious steps in that direction. The very doubtful outlook for fall business makes manufacturers willing to grasp at any promotional effort which will help sales; and to just that extent the wool goods industry will cooperate in whatever constructive plan may evolve from next Tuesday's meeting.

Many Groups to Be Represented

Representatives from the following associations are expected to attend the meeting: National Wool Growers Association; Boston Wool Trade Association; Philadelphia Wool & Textile Association; Chicago Wool Trade Association; National Knitted Outerwear Association; National Wool Blanket Manufacturers Association; Institute of Carpet Manufacturers of America; Clothing Manufacturers Research Board; Industrial Council of Cloak, Suit & Skirt Manufacturers; International Association of Garment Manufacturers; Merchants' Ladies Garment Association; New York Clothing Manufacturers Exchange.

The group which will represent the National Association of Wool Manufacturers consists of: Franklin W. Hobbs, president Arlington Mills; A. E. Colby, treasurer, Pacific Mills; Col. C. F. H. Johnson, president, Botany Consolidated Mills; Allen R. Mitchell, Jr., Allen R. Mitchell & Son; Lionel J. Noah, president, American Woolen Co.

▸ Tynan New President of Throwsters Institute

The recently formed Throwsters Research Institute held a meeting last Sunday at the Penn Stroud Hotel, Stroudsburg, Pa., which was attended by 32 throwsters. John D. Dunlop resigned as president and Henry J. Tynan, of the Tynan Throwing Co., was elected to succeed him. The members also elected C. J. Knowles, president of the Pen Argyle Silk Co., Pen Argyle, Pa., as vice-president and to the board of governors. A code of ethics for the industry and by-laws were adopted at the meeting and a decision was reached to incorporate under the laws of the State of New York.

Members reported that the work of the institute had already brought improvement in the condition of the thrown silk industry.

▸ Good Practice and Bad in Cotton Carding

(Continued from page 86)

stripping brushes should be recovered with new wire fillet immediately the brush ends show signs of wear, and the set colors should be checked up periodically to keep the brush in the correct position on the cylinder and doffer during stripping. A regular system of taking down the card backs should be in operation.

Drawing frames, like all other machines, soon deteriorate if they are not periodically checked up. The drawing rollers should be taken out and scoured at least every three months. All worn roller-bearing brushes should be replaced by new ones, and all the roller necks and stands cleaned and greased. The top leather rollers should be systematically changed, and constant care should be given to the top and bottom roller cleaners. If these are neglected, clearer waste will be snatched forward, and lumpy, dirty roving will be produced at the following machines.

Sizing in its real sense is performed at the drawing frame. Irregularities that have slipped through the picker room can be corrected at this point. The sliver should be sized several times per day and the draft gears changed if the correct counts are not being produced. If this is done conscientiously, little trouble will be met with in all subsequent processes. Cleaning and oiling must be strictly attended to, or excessive wear in the high-speeded and heavily weighted drawing rollers will soon lead to inefficient work and loss of production through excessive breakages.

The roving frames—slubbers, intermediates, rovers and jacks—need special care. Overdrafted or undertwisted rovings can never be made into good, even yarn. An incorrect builder gear leads to the same unsatisfactory result. The frames should be lined up periodically and the roller settings checked. The roving should be sized when two layers have been wound on the bobbins, and the frames kept under observation throughout the build of the bobbin until doffing time.

A simple system of marking the bobbins to distinguish qualities and hanks should be adopted to avoid mixing. Where double roving is employed, creeling should be arranged to run one full and one half bobbin together. A good carder will train his help to understand the dangers of careless oiling, and he will keep a record of the history of each frame—for instance, when lined up, when scoured, when rollers were set, which hank is being produced, what gears are on, what turns per inch is being inserted, and all other particulars likely to be of service to him.

Cotton-Textile Institute Gets Honorable Mention for Services

The Cotton-Textile Institute was awarded honorable mention in the annual competition of the American Trade Association Executives for the trade association reporting accomplishments considered most valuable to the public and to industry at large. Awards were announced at the annual convention of the Executives in New York last Tuesday.

"Re-establishing Consumer Acceptance" was the subject of an address presented by George A. Sloan, president of the Cotton-Textile Institute, at the morning sessions of the convention.

Mr. Sloan then reviewed the various activities of the institute and the constructive work being done by the industry to effect a sounder basis. He concluded with the thought that "notwithstanding the work that has been done in extending cotton markets, the end of these developments is not even remotely visible."

"When one considers the amazing versatility of cotton fiber," said Mr. Sloan, "these opportunities are limitless and they challenge the resourcefulness of a great industry in advancing its products into ever-increasing fields of usefulness."

▸ Textile Exposition and Styles Show at State College April 15

Textile students of North Carolina State College, under the direction of superintendent James B. Lamar of Spray, and Clarence N. Cone, Jr., of Greensboro, are making extensive preparations for their Thirteenth Annual Textile Exposition and Style Show, which will be held at Raleigh on April 15, as previously stated in these columns.

Eighty young women, representing Catawba, Louisburg, Meredith, Peace, and Queens-Chicora Colleges, will demonstrate costumes which they have made as a part of their classwork in home economics, from fabrics designed and woven in the textile school by textile students.

▸ Silk Quality Conference in Philadelphia, April 14

The National Association of Hosiery and Underwear Manufacturers announced in New York on Thursday that a conference on "two-tone" raw silk will be held at the Commercial Museum, Philadelphia, next Thursday afternoon April 14, immediately following the annual luncheon and convention of the association there. The convention and luncheon are two highlight events of Knit Goods Week in Philadelphia, and are being held in conjunction with the Knititng Arts Exhibition at the Museum. The silk conference will consider recent complaints regarding the quality of raw silk imports, and will be opened with an address by D. E. Douty, general manager of U. S. Testing Co.

▸ Textile Arbitration Council Now Complete

Ralph Hunter, chairman of the board of the International Association of Garment Manufacturers, has been appointed as the representative of that organization on the General Arbitration Council of the Textile Industry.

The complete representation of the eight associations belonging to the council is as follows:

George A. Sloan (chairman), president, Cotton-Textile Institute.

Lincoln Baylies, former president, National Association of Cotton Manufacturers.

Robert Lassiter, representing the American Cotton Manufacturers Association.

W. J. Gallon, chairman arbitration committee, Association of Cotton Textile Merchants of New York.

M. J. Warner, chairman of the Arbitration committee, Textile Converters Association.

W. L. Pierce, president, National Association of Finishers of Textile Fabrics.

George I. Seidman, president, Textile Brokers Association.

Ralph Hunter, chairman of the board, International Association of Garment Manufacturers.

▸ Philadelphia Textile School Alumni Plans

Bradley C. Algeo, president of the Alumni Association of the Philadelphia Textile School has announced the dates for the annual events in connection with the graduation exercises. The annual business meeting and commencement will be held, Thursday, June 2; the annual outing will be held Friday, June 3, at the Manufacturers' Country Club, Oreland, Pa.; the annual banquet will be held that same evening.

▸ Dinner to Representative Beck Postponed

Owing to the illness of Congressman James M. Beck, Pennsylvania, the dinner which was to be tendered to him by Philadelphia manufacturers, March 31, has been postponed until April 18.

▸ Botany Improves Position

The report of Botany Consolidated Mills, Inc., and subsidiary, Botany Worsted Mills, for the year ended Dec. 31, 1931, shows a net loss of $3,349,992 after deductions for depreciation, amortization, interest and such charges. Credit of a $1,125,499 refund of the 1917 Federal income tax and $2,423 applicable to minority interest in subsidiary, brings the major company's deficit down to $2,222,068 as against a net loss in 1930 of $3,044,148.

In an extensive statement which accompanied the report, Col. Charles F. H. Johnson, executive vice-president of Botany Consolidated Mills, writes optimistically of the 1932 outlook, citing a substantial gain during the quarter just closed. In the first 10 weeks of 1932, he states, actual shipments totalled $2,400,000 against about $1,300,000 for the same period in the year previous. Gross orders were $3,000,000 against $1,500,000, he added, asserting that the company "will show an operating profit for the first quarter against a heavy operating loss a year ago." He predicted a "gratifying showing" in the April-June quarter, although this is normally a slack period. In his minute analysis of mill conditions he said there is a new spirit and increased cooperation among personnel which is bringing good results.

▸ Organon Deprecates Rayon's Fear of Silk

Curtailment of production in the rayon yarn industry to a level of about 70% of capacity for March as against 80 to 85% a year ago is not causing any alarm among manufacturers as a drop in production of as much as 20% from the banner year of 1931 was more or less expected, says the current issue of *The Textile Organon*, published by the Tubize Chatillon Corp.

The publication further states that there is unnecessary fear that silk is displacing rayon in some products since "cotton, rather than silk, should be the greatest competitor of rayon in the knit goods field."

The publication adds:

"One of the rayon's strongest points at the present time is its price stability. Since Jan. 1, this factor of stable viscose prices has redounded to the industry's benefit. A manufacturer buys rayon today and knows that thirty or sixty days hence, when this yarn is in a fabric, he will not have to take a loss on the fabric, because the raw material has held steady. This situation should be contrasted with that of silk, from the fabricator's point of view."

Georgia Manufacturers Meet in Atlanta

The Cotton Manufacturers Association of Georgia held its thirty-second annual meeting in Atlanta, Ga., April 5 and 6, with W. D. Anderson, of New Holland, Ga., president of the organization, presiding. Addresses were delivered by E. G. Field, of William H. James & Associates, Atlanta, Ga.; J. H. Cheatham, president, Georgia-Kincaid Mills, Griffin, Ga.; W. D. Anderson, Sr., president, Bibb Mfg. Co., Macon, Ga.; H. H. Willis, director of the Clemson College (S. C.) Textile School, and President Anderson. N. E. Elsas of Fulton Bag & Cotton Mills was elected president for the coming year at the final session held Wednesday afternoon in the main dining room of the Atlanta-Biltmore Hotel. The meeting will be reported in more detail in next week's issue of TEXTILE WORLD.

▸ Strike Spreads to Other Plants in Horsecreek Valley

Operatives at the Aiken plant of United Merchants & Manufacturers, Inc., Bath, S. C., and the Seminole Mills of the same company, Clearwater, S. C., numbering about 600, went out on strike April 1. Approximately 500 workers at the Langley (S. C.) plant of this company walked out March 28 in protest against wage reductions. Retail stores operated by the mills have been closed and trade in the mill communities was said to be at a standstill. No disorders had occurred and the mill management would make no statement other than to say that the plants were closed.

▸ May Extend Curtailment Plan in Print Cloth Industry

Definite action looking toward more extensive curtailment in the print cloth division of the cotton goods industry was postponed until certain requirements have been met and further consideration directed to the immediate situation by individual manufacturers, according to announcement following a meeting of mill executives and commission house representatives in Spartanburg, S. C., April 5. Executives representing about 70,000 print cloth looms were joined at the meeting by eight or ten commission house men from New York and a general discussion of conditions in the group consumed most of the time. Dr. W. C. Hamrick, Gaffney, S. C., acted as spokesman and announced that the meeting Tuesday in no way affected the three-point curtailment program approved at the meeting in Spartanburg on Jan. 29. It was felt that an announcement on further curtailment plans might be forthcoming in a few days.

▸ Rare Etchings Used In Advertising Series

The Aberfoyle Mfg. Co., a member of the Durene Association of America, is inaugurating a new advertising series in which fine etchings will be reproduced in such a way that they may be preserved and framed. The first of the series is a striking view of the Arc de Triomphe, Paris, by John C. Vondrous, American painter. It is stated that in this series, the Aberfoyle company aims to develop a new feeling for artistic trade advertising.

▸ May Sell Further Quantities of Mohair

It is understood that negotiations are under way which may lead to the disposal of further quantities of the mohair owned by the National Wool Marketing Corp. in other than the usual channels. About 5,000,000 lb. was recently sold to carpet mills at a price about equal to that quoted on South American B.A. 6s, a carpet wool. It is understood that the marketing corporation is still carrying about 15,000,000 lb.

Textile Calendar

Knitting Arts Exhibition, 28th Annual Show, Commercial Museum, Philadelphia, April 11 to 15, 1932.

National Association of Hosiery and Underwear Manufacturers, Annual Meeting, Commercial Museum, Philadelphia, Pa., April 14, 1932.

National Association of Wool Manufacturers, Wool Industries Trade Groups, special meeting, Commodore Hotel, New York, April 12.

North Carolina State College, Annual Exhibition and Style Show, Raleigh, N. C., April 15, 1932.

Southern Textile Association, Eastern Carolina Division, Spring Meeting, N. C. State College, Raleigh, N. C., April 15, 1932.

Southern Textile Association, South Carolina Group, Organization Meeting; Carding Discussion, Columbia, S. C., April 22, 1932.

Southeastern Section of American Association of Textile Chemists and Colorists, spring meeting, Auburn, Ala., April 30, 1932.

U. S. Institute of Textile Research, directors and members, New York, May 4.

Phi Psi Annual Convention, Green Park Hotel, Blowing Rock, N. C., May 13-15.

Textile Forum, N.A.C.M., General Meeting for agents and superintendents, Chamber of Commerce Bldg., Boston, Mass., April or May.

Second National Cotton Week, May 16 to 21, 1932.

American Cotton Manufacturers Association, annual convention, Atlanta-Biltmore Hotel, Atlanta, May 20-21, 1932.

National Association of Woolen and Worsted Overseers, semi-annual meeting, Rocky Point, R. I., May 21, 1932.

Southern Textile Assn., annual meeting, Hendersonville, N. C., June 24-25.

Southern Textile Exposition Textile Hall, Greenwich, S. C., Oct. 17 to 23, 1932.

National Association of Cotton Manufacturers, Boston, Oct. 26-27.

S.T.A. Eastern Carolina Division Meets April 15 At N. C. State College

Eastern Carolina Division of the Southern Textile Association will hold its spring meeting at N. C. State College, Raleigh, N. C., April 15, according to Walter C. Taylor, Charlotte, N. C., secretary of the association. D. F. Burns, general superintendent of spinning, Durham (N. C.) Hosiery Mills, is chairman of the division and will preside over the discussion of carding and spinning problems. The annual exposition and style show of the textile school at State College will be staged in connection with the S.T.A. meeting and a large attendance is expected.

Call Trade Practice Conference For Silk Industry Apr. 21

The Federal Trade Commission has scheduled a trade practice conference for the silk industry to be held Thursday, April 21, at 10 o'clock in the Hotel New Yorker, New York City, with Chairman William E. Humphrey of the commission, presiding.

Methods of competition will be discussed, and an effort will be made to adopt rules of practice which will tend to eliminate trade abuses. Proper weighting of silk goods will also be considered.

Boston Stock Auctions

The following sales of textile shares were made at auction in Boston on March 30:

Shrs.	Mill	Par	Price	Change
2	Ludlow	...	48½	—8½
102	Arlington	...	11–11½	— ¼
45	Amoskeag, com. (old stock)	100	8½–8	....
25	Dwight	25	3	....
174	Total			

Boston Wool Receipts

Receipts of domestic and foreign wools at Boston, also imports at Philadelphia and New York for the week ended Apr. 5, based upon data compiled by Dept. of Agriculture, follow:

	Week Ended Apr. 5	Total to Date 1932	Total to Date 1931
Domestic	187,000	14,223,000	19,642,000
Foreign	363,000	10,164,000	13,375,000
Total	550,000	24,387,000	33,017,000
IMPORTS AT PRINCIPAL PORTS			
Boston	363,000	10,164,000	13,375,000
Philadelphia	55,000	7,086,000	9,637,000
New York	218,000	8,457,000	14,118,000
Total	636,000	25,707,000	37,130,000

Bear Brand Abandons Expansion Only

Statement previously made and widely circulated in the daily press to the effect that Bear Brand Hosiery Co., with plants at Beaver Dam, Hartford and Waupon, Wis., had decided to abandon its entire investment in Wisconsin has been stated to be incorrect. It is pointed out that the company is merely abandoning its plan to expand its plant at Beaver Dam, Wis., and is now making this expansion in its plant at Kankakee, Ill.

Garvin Reception Changed To May 4

The luncheon-reception to be tendered to Francis P. Garvan by officials of leading textile associations and members of the United States Institute for Textile Research, in honor of his acceptance of the presidency of the institute, has been postponed from April 29 to Wednesday, May 4, at the Hotel Biltmore, New York. The change was necessitated by an unexpected and important engagement which will require Mr. Garvan's presence elsewhere on the first named date. The quarterly meeting of the board of directors of U. S. Institute also will be postponed to Wesdnesday, May 4.

Textile Foundation Announces Research Awards

Research fellowship and scholarship awards to bring about scientific knowledge and advancement in the textile industries were announced Thursday by the Textile Foundation. The broad purpose impulsing this far-reaching program is to build up and develop a body of research-trained individuals who, although engaged in scientific fields, will at the same time be working and thinking in terms of textile fibers and material development. Nearly 700 requests were received by the directors from 39 States. In making the selection the directors were fortunate in having the active help of a group of advisors whose positions and accomplishments in the world of science are notable.

Tubize Restores Rayon Price Guarantee

The rayon industry became a divided camp on the issue of a price guarantee this week, when Tubize Chatillon Corp. announced restoration of the guarantees on all yarns, and the Viscose Co. announced that it saw no need for such action and would not restore the price protection. While it is expected that some producers will follow Tubize lead, the exact line-up on the question is in doubt. Tubize guarantees knitting yarn prices for 60 days from date of invoice and weaving yarn prices for 90 days; the guarantee became effective Thursday.

Amoskeag Curtailing

Following rejection by a 10 to 1 vote among its employees of a proposed wage reduction, the Amoskeag Mfg. Co., Manchester, N. H., began on April 4 to close down several of its largest manufacturing units.

Business News

R. E. Steere Now with Curtis & Marble

Robert E. Steere of Pawtucket, R. I., is now associated with Curtis & Marble Machine Co., Worcester, Mass., manufacturer of finishing machinery for all kinds of fabrics. He will act as a general representative for the company and will devote the greater part of his time to New England territory.

Mr. Steere was for 14 years associated with Lorraine Mfg. Co. of Pawtucket and Westerly, R. I., and was also with Nashawena Mills, New Bedford, Mass., and the Manville Co. at Woonsocket, R. I.

Perry Holder Elected Vice-President of Tolhurst

P. G. Mumford, president of the American Machine & Metals, Inc., has announced the appointment of Perry Holder as vice-president and director of the Tolhurst Machine Works, manufacturers of extractors, which is a subsidiary of the former company. Mr. Holder will be in charge of operations. For several years, Mr. Holder was sales manager of the Prosperity Co., Syracuse, N. Y., and more recently assistant to the vice-president of American Machine & Metals, Inc. The Tolhurst plant is located in Troy, N. Y., with executive offices at 100 Sixth Avenue, New York City.

G. D. Davis to Guide Sales of Three Divisions of National Oil Products

C. P. Gulick, president of the National Oil Products Co., Harrison, N. J., has named G. D. Davis, general sales manager of three of the five divisions of that company. Mr. Davis will direct the sales of Euthol, Nopco Cleansers and Nopco Industrial Oils. He joined the company in 1918 as a shipping clerk at a salary of $12 a week. More recently he has been in charge of the company's Chicago office and organized a Boston branch office.

H. W. Anderson Flies Home for Knit Goods Show

H. W. Anderson, president of Fidelity Machine Co., Philadelphia, returned to Philadelphia last week by airplane from a western trip.

Obituary

J. Elwood Cox

J. Elwood Cox, aged 75, first vice-president, Pickett Cotton Mills, Inc., High Point, N. C., veteran banker and business man, died at his home March 28. His death was attributed to heart trouble. He manufactured shuttle blocks as a young man before he went to High Point.

Edward Smith

Edward Smith, aged 59, former president and treasurer of the Swift River Co., Enfield, Mass., died March 26. He was a native of Enfield and had lived there all his life. His company was dissolved in 1912.

WEEK'S DEVELOPMENTS IN TEXTILE MARKETS

Dull Cotton Yarn Market

Limited interest is still reported in cotton yarns. As a result the market is almost stationary, but some houses state they have noted a stiffening tendency on the part of certain spinners. Occasional inquiries are reported. Some of these have been for fair-size quantities, but at prices which neither dealers nor spinners would care to consider. Especially is this true when deliveries are extended over several months. The average spinner is not willing to consider any volume business that would run more than three or four weeks.

Spot sales of 10s carded framespun are reported around 12½c., with quotations averaging 12½ to 13c., and few inquiries being made. Weaving yarns also find scattered inquiry in limited volume, with 20s-2 warps quoted at 14½c., but spinners usually asking 15 and 15½c.; 30s-2 warps are held at 19c., with skeins at 18c.; 8s-3 tinged are at 11c. Little inquiry is reported for combed yarns, with prices at one of the lowest points in their history in certain quarters. Mercerized yarns continue to receive specifications against contracts, with prices holding well. New business is not active.

Cotton Market Nervous

There has been an undercurrent of nervousness and uncertainty in the cotton market during the week. This has been reflected by further liquidation and while there were rallies on Monday, they were followed by a renewal of the decline which brought contracts to new lows for the movement. Evidently sentiment has been unsettled by a variety of influences including uncertainty as to the marketing policies of the Federal Farm Board or the co-operatives after the end of this season, particularly with reference to the disposition of the stabilization stocks. Moreover, the feeling appears to be growing stronger that there will be only a moderate decrease in acreage and that recent more favorable weather has permitted more rapid progress with coming crop preparations. After the break to 6.02 for May contracts at the end of March, the price rallied to 6.31 in sympathy with rallies in grain and stocks but by Wednesday had eased back to previous lows.

Waiting Market in Cottons

Cotton goods were quiet but steady while awaiting further plans for mill curtailment designed to keep production of cloth from over-running the light demand for goods which exists at the present time. Business accomplished was not of sufficient size to try out the market. For small lots, prices on 38½ in. 64x60s ranged from 3⅝c. to 3¾c., but nominal asking prices on larger lots were at the latter figure, unchanged from last week. Sheetings and drills were inactive though there were inquiries in the latter field which were encouraging. Fine and fancy cottons met scattered orders but trade was light because of the slow development of the spring season in retail circles. Movement of finished goods has been slow, but, as distributors stocks are low, any improvement at retail is expected to find quick reflection in the primary market.

Worsted Yarns Quiet

Quiet continues in worsted yarns. The usual weekly sales of yarns for prompt delivery were at low ebb. The situation is unusual since formerly, during a quiet market, there were always certain bright spots in particular lines, while today there seems to be no department of the industry that stands out above the others in activity. There are no quotable changes in prices noted, so that there is no apparent effort being made to start something by means of price concessions. Variations seem to be due to difference in grades and quality of stock, as for example single 18s slubdyed average 90c. for good quality high-quarter, with 88½c. and 85c. for lower qualities, the latter being unfit for use in making good grade bathing suits.

Knitting lines continue quiet with only scattered interest in small lots. Bathing suits are still slow getting under way. Women's sweater business is waning, with men's sweaters spotty, and jersey cloth interest scattered. Dress goods and men's wear mills are sampling here and there.

Wool Prices Sag Again

The restricted wool selling of the last week has been at the expense of values and the business in territory wool has been on the low side of quotations. Rumors that original bag fine wool of the Montana type had been established on a 45c. level proved baseless. Offers were made on that basis but rejected, and a substantial quantity of wool for which 46c. was bid was sold later at 49c. The turnover in graded wools has been small. The situation in fleece wools is unsettled. There is an oversupply of delaine and no immediate outlet.

Texas fall wool has been moving more freely, one house having sold some 500,000 lb. around 33c. clean. High prices on fine noils are affording dealers an opportunity to move fall wool in larger volume. Since the first of the year fine noils have advanced 5c., while Texas fall wool has declined 5c.

Attention Given Fall Wool Goods

Wool goods mills, especially manufacturers of men's suitings, centered their attention on fall lines this week, and numerous firms made preliminary showings. Prices for the new season show a downward trend, but it is too early to estimate percentages. Fall lines of men's suitings indicate even less interest in novelties than last season.

Women's wear spring fabrics continued active and some firms looked for buying through to the beginning of May. Prices of women's year lines are softer; mills with substantial stocks of spring goods are sacrificing, but the firms which curtailed early and are in good stock position are resisting the downward pressure. Fall openings of women's wear wool goods are not expected to start before late May.

Market tone is hesitant. The coolness manifested by buyers to the fall lines of men's suitings, while not unexpected, has been somewhat discouraging. The happy factor is that it is strengthening the determination of weavers to hold down on production.

Silk Futures Weaken

A firming of currency in Japan strengthened raw silk prices on both sides of the Pacific and brought a 5c. advance early this week, but Thursday brought weak advices from Japan which reversed the situation; futures hit new lows, October and November falling to $1.36 equalling the April low figure of March 22. Many mills have curtailed and place little business. Thrown yarn is quiet, business being limited to a day-by-day movement. Spinners are concentrating their efforts on developments of new products; current demand comes mainly from underwear mills. Increased call for prints featured the broadsilk market and weavers talk of a possible shortage, once the weather becomes spring-like; prices are steady in the medium range, but there is pressure to clear low-priced lines.

Knit Goods Are Steady

Mesh hosiery, both full-fashioned and sewn, was in steady though light demand this week. The expected price pressure on sewn mesh has not developed, thanks to light stocks, and knitters enjoy fairly healthy turnover. Half-hose has been selling, but unprofitably.

Weakness in lightweight underwear quotations appeared to center chiefly on sub-standard mechandise; mills making standard lines reported moderate movement, with prices steady. Heavyweight underwear lines of medium-price market now are all open, but buyers show very little interest; higher quality lines will open later this month.

Cold weather has slackened call for sweaters and bathing-suits; there is no great surplus available. Prices are firm.

Rayon Trade Light

Increased activity of southern weavers helped to stimulate rayon yarn sales during the last week of March, with the result that some rayon producers found the total turnover for March to be "normal for the depression period."

Rayon production hovers between 60 and 65% and indications are it may stay in that range until the warm weather lull forces it further down. Plants average 6 weeks stock on hand.

QUOTATIONS

at close of business, April 6, 1932

Prices cover average qualities unless otherwise stated

Cotton Goods

	Apr. 6	Mar. 30	April 8 1931
PRINT CLOTHS			
27 -in., 64x60, 7.60	2¼c.	2¼c.	3⅞
38½-in., 64x60, 5.35	3½–3¾c.	3¾–3¾	5⅜–5½c.
39 -in., 68x72, 4.75	4½c.	4½c.	6⅝–6¾c.
39 -in., 72x76, 4.25	5¼c.	5¼	7⅛–7½c.
39 -in., 80x80, 4.00	5½c.	5½c.	7⅜–7⅝c.
BROWN SHEETINGS			
36-in., 56x60, 4.00	4¼c.	4¼c.	5¾c.
36-in., 48x48, 3.00	4¼c.	4¼c.	6¼c.
37-in., 48x48, 4.00	4–4¼c.	4¼c.	5¼c.
PAJAMA CHECKS			
6½-in., 72x80, 4.70	4½–4¾c.	4½–4¾c.	6⅜c.
6 -in., 64x60, 5.75	4–4¼c.	4–4¼c.	5¼–5¾c.
MISCELLANEOUS			
Drills, 37-in., 3 yd..	4½–5c.	4¾c.	6¾c.
Denims, 2.20	9¼c.	9¼c.	12 c.
Tickings, 8 oz.	12 c.	12 c.	15½c.
Standard prints	6¼c.	6¼c.	7¼c.
Eastern staple ginghams, 27-in.	6 c.	6 c.	8 c.

Cotton Waste

Peeler comber	6 – 6¼
Peeler strips	5 – 5½
Sak. comber	4¾ – 5
Choice willowed fly	2¾ – 3½
Choice willowed picker	2 – 3
Sak strips	7 – 7½
Linters (mill run)	2 – 2¾
White spooler (single)	4¼ – 4½

Cotton Yarn

CARDED (Average Quality)

Double Carded 2c.—4c., higher according to quality

SINGLE SKEINS OR TUBES (Warp Twist)

4s to 8s	$0.12	22s	$0.15½
10s	– .12½	24s	– .16½
12s	– .13	26s	– .17½
16s	– .14	30s	– .18½
20s	– .15	40s ex. qual	– .26½

TWO-PLY SKEINS AND TUBES

8s-2	$0.12½	26s-2	$0.17½– .18
10s-2	– .13	30s-2	18½– .19½
12s-2	– .13½	36s-2	– .24½
14s-2	– .14	40s-2	– .25½
16s-2	– .14½	49s-hi.brk	– .26½
20s-2	15 – .15½	50s-2	– .32½
24s-2	16½– .17	6ps-2	– .35½

SINGLE WARPS

10s	$0.12½	24s	$0.16½
12s	– .13	26s	– .17½
14s	– .13½	30s	– .19
16s	– .14	40s ex. qual	– .26½
20s	– .15		

TWO-PLY WARPS

8s-2	$0.12½	24s-2	$0.17 – .17½
10s-2	– .13	26s-2	18 – .18½
12s-2	– .13½	30s-2	19 – .19½
14s-2	– .14	49s-2 ordin.	– .25½
16s-2	– .14½	50s-2	– .32½
20s-2	15– .15½	60s-2	– .35½

8s-3 and 4-ply skeins and tubes; tinged, 11; white, 12; waste, 10½

HOSIERY CONES (Frame Spun)

8s	$0.12½	22s	$0.15½– .16
10s	– .12½	24s	– .16½
12s	– .13	26s	– .17½
14s	– .13½	30s tying	18 – .18½
16s	– .14	30s reg	19 – .19½
18s	– .14½	30s ex. qual.	20 – .20½
20s	15 – .15½	40s	– .25½

COMBED PEELER (Average Quality)

TWO-PLY—(Knitting Twist) Cones

20s-2	$0.25	60s-2	$0.39 – .40
30s-2	.27 – .28	70s-2	.50 – .52
36s-2	.29 – .30	80s-2	.60 – .63
40s-2	.30 – .31	90s-2	.85 – .87
50s-2	.33 – .35	100s-2	.98 –1.05

WARPS, SKEINS AND CONES

TWO-PLY—(Warp Twist)

20s-2	$0.25	60s-2	$0.40 –0.41
30s-2	.28 – .29	70s-2	.50 – .52
36s-2	.30 – .31	80s-2	.60 – .62
40s-2	.31 – .32	90s-2	.85 – .90
50s-2	.35 – .36	100s-2	.95 –1.02

SINGLES

12s	$0.18½–0.19½	30s	$0.26 –0.27
14s	19 – .20	38s	.29 – .30
16s	.19½ – .20½	40s	.30 – .31
18s	.20 – .21	50s	.33 – .34
20s	.21 – .22	60s	.39 – .40
24s	.23 – .24	70s	.50 – .51
28s	.25 – .26	80s	.60 – .61

MERCERIZED CONES—(Combed, Ungassed)

26s-2	$0.42 –0.44	90s-2	$0.95
30s-2	.43 – .45	100s-2	1.20–1.25
36s-2	.45	120s-2	1.55–1.60
40s-2	.47	30s	.49– .51
45s-2	.48	40s	.54– .56
50s-2	.50 – .52	50s	.60– .62
60s-2	.55 – .57	60s	.65– .68
70s-2	.69	70s	.77– .80
80s-2	.79	80s	.92– .96

Cotton Prices and Statistics

COTTON STATISTICAL DATA

(Fluctuations of Futures)

	Closed Mar. 31	For Week High	For Week Low	Closed Apr. 6	Net Ch'ge
April	6.04	6.23	6.04	5.96	—0.08
May	6.11	6.32	6.02	6.03	—0.08
June	6.19	6.38	6.19	6.11	—0.08
July	6.31	6.49	6.20	6.21	—0.10
August	6.38	6.55	6.38	6.29	—0.09
September	6.43	6.62	6.43	6.38	—0.05
October	6.52	6.73	6.45	6.45	—0.07
November	6.58	6.77	6.58	6.52	—0.06
December	6.68	6.89	6.63	6.60	—0.08
January	6.76	6.98	6.72	6.69	—0.07
February	6.83	6.99	6.83	6.76	—0.07
March	6.90	7.11	6.88	6.83	—0.07

SPOT FLUCTUATIONS FOR WEEK

(Middling)

	New York	New Orleans	Liverpool
Thursday, March 31	6.20	6.11	4.95
Friday, April 1	6.30	6.18	4.81
Saturday, April 2	6.25	6.13	4.86
Monday, April 4	6.25	6.29	4.88
Tuesday, April 5	6.25	6.17	4.91
Wednesday, April 6	6.10	6.04	4.79

FOREIGN COTTONS

Egyptian Cotton

Alexandria Exchange, Apr. 5.		Change
May. Sak	12.30	+0.15
Apr. Uppers	10.07	+0.04
Apr.-May Shipment c. i. f. Boston (Tariff not included)		
Fully good fair Sak (No. 38)		12.25
Fully good fair to good Uppers (No. 10)		10.50

(By Anderson, Clayton & Co.)

Foreign cottons	F. O. B. New York, Cents
Peruvian Tanguis Strict Middling	16
Peruvian Pima No. 1	15½
Peruvian Moderate Rough	10
Peruvian Full Rough	16
China Tientsin No. 1	9
India Rough	7 to10
India Smooth	6½ to 7½

(By Bruns-Nordeman Co.)

MOVEMENT INTO SIGHT

	This Year	Last Year
Week	194,000	86,000
Season	13,619,000	12,195,000

WORLD VISIBLE SUPPLY

	Apr. 1	One Year Ago
Interior towns and ports of U.S.*	6,179,000	†4,977,000
Afloat to and at ports of Europe	1,517,000	1,882,000
Afloat to and at Ports of Orient	1,186,000	498,000
Total	8,882,000	7,357,000
	Decrease	Decrease
Change during week	95,000	†110,000

*Includes afloat to New York.

FORWARDINGS TO MILLS OF WORLD

	This Year Week	This Year Season	Last Year Week	Last Year Season
N. States, U.S.	21,000	633,000	15,000	662,000
So. States, U.S.	88,000	3,507,000	67,000	2,997,000
Total U.S.	109,000	4,140,000	82,000	3,659,000
Great Britain	25,000	899,000	15,000	633,000
Continent	96,000	2,473,000	78,000	2,491,000
Orient	56,000	2,258,000	10,000	920,000
Canada and other America	3,000	134,000	5,000	166,000
Total foreign countries	180,000	5,764,000	108,000	4,210,000
World total	289,000	9,904,000	190,000	7,869,000

EXPORTS FROM UNITED STATES

Total	172,000	6,836,000	123,000	5,616,000

AVERAGE PRICE APR.-MAY, SHIPMENT HARD WESTERN COTTON

F.o.b. New England

	Middling	St. Middling
1 1/16-in	8½–8¾c.	9 – 9¼c.
1⅛-in	9 –9¼c.	9½– 9¾c.
1 3/16-in	10–10½c.	10½–10¾c.
1¼-in	12¼–13½c.	13¼–14¼c.

Based on New York, May, 6.16

SPOT FLUCTUATIONS AND STOCKS

Markets	Mar. 30	Apr. 6	Sales	This Week	Last Year
Galveston	6.35	6.10	3,376	747,025	547,492
New Orleans	6.33	6.04	5,502	1,080,611	758,304
Mobile	6.10	5.75	1,501	193,626	241,474
Savannah	6.23	6.03	3,216	256,564	363,863
Norfolk	6.35	6.05	189	61,443	84,729
New York	6.40	6.10	950	205,980	228,078
Augusta	6.31	6.00	414	120,015	92,732
Memphis	5.70	5.40	13,036	399,507	261,943
St. Louis	5.70	5.75			9,953
Houston	6.30	6.00	7,721	1,394,648	1,137,543
Dallas	5.90	5.60	4,042	25,272	11,650

DIFFERENCES ON AND OFF MIDDLING

WHITE GRADES

	Dallas	Memphis	Montgomery	Augusta	Average
M.F	0.50†	.75†	0.65†	0.63†	0.64†
S.G.M	.40†	.50†	.55†	.56†	.51†
G.M	.30†	.40†	.40†	.38†	.37†
S.M	.20†	.25†	.25†	.19†	.22†
S.L.M	.20*	.20*	.25*	.19*	.22*
L.M	.40*	.50*	.50*	.50*	.48*
S.G.O.**	.75*	.75*	.85*	.88*	.80*
G.O	1.00*	1.00*	1.15*	1.25*	1.09*

YELLOW TINGED

G.M	0.25*	0.25*	0.25*	0.25*	0.26*
S.M	.35*	.40*	.35*	.38*	.39*
M.**	.50*	.50*	.50*	.50*	.52*
S.L.M	.90*	.90*	.85*	.75*	.88*
L.M	1.25*	1.25*	1.15*	1.13*	1.24*

YELLOW STAINED

G.M	0.50*	0.55*	0.50*	0.50*	0.50*
S.M.**	.90*	.90*	.85*	.88*	.87*
M.**	1.25*	1.15*	1.15*	1.25*	1.22*

BLUE STAINED

G.M.**	0.65*	0.60*	0.50*	0.63*	0.58*
S.M.**	1.00*	.80*	.85*	1.00*	.91*
M.**	1.25*	.90*	1.15*	1.25*	1.18*

**Grades not deliverable on contract.

*Off Middling †On Middling

Wool

OHIO, PENNSYLVANIA AND WEST VIRGINIA
(IN GREASE)

Fine delne	$0.20 –$0.21	⅜ blood	$0.20 –0.21
Fine clthg	.16 – .17	¼ blood	.18 – .19
½ blood	.20 – .21		

TEXAS AND CALIFORNIA
(CLEAN BASIS)

Texas, 12 months	$0.49 –0.51
California, Northern	.42 – .43

PULLED—EASTERN (CLEAN BASIS)

A.A	$0.53 –$0.55	B-Super	$0.42 –0.45
A-Super	.47 – .49	C-Super	.37 – .39

MONTANA, IDAHO AND WYOMING
(CLEAN BASIS)

Staple fine	$0.50 –0.52
Staple ½ bld	.48 – .50
Fine and fine medium	.47 – .49
⅝ blood	.43 – .45
¾ blood	.36 – .38

MOHAIR—DOMESTIC

Best carding	$0.20 –0.22
Best combing	.25 – .27

MOHAIR FOREIGN (IN BOND)

Turkey fair, average	$0.17 –0.21
Cape firsts	.18 – .21

FOREIGN CLOTHING AND COMBING
(CLEAN BASIS IN BOND)

Australia:	
70s	$0.38 –0.40
64s	.30 – .32
58s-60s	.28 – .30

(IN GREASE)

Montevideo:	
58s-60s	$0.17 –0.18
56s	.16 – .17
50s	.15 – .16
Buenos Aires:	
4s, 40-44s	$0.10 –0.11
5s, 36-40s	.09 – .10

FOREIGN CARPET (GREASE BASIS IN BOND)

Aleppo washed	$0.19 –0.20
China: Combing No. 1	.12 – .13
China Filling Fleece	.11 – .12
Szechuen ass't	.12 – .13
Cordova	.09 – .10
Scotch black face (nominal)	.14 – .16
East India: Kandahar	.15 – .16
Vican'r	.19 – .20
Joria	.19 – .20

Worsted Yarns

ENGLISH SYSTEM WEAVING

2-20s 36s	$0.70– .72½
2-24s 40s	– .80
2-26s 44s	80 – .82½
2-28s 46s	.85 – .87½
2-30s 48s	.90 – .92½
2-32s 50s	.92½– .95
2-30s 64s fancy mixes	1.20 –1.22½

(Single yarns 5c. less than above)

2-36s 58s	1.00 –1.02½
2-40s, 60s	1.12½–1.17½
2-40s, 64s	1.15 –1.20
2-50s, 66s	1.30 –1.35
2-60s, 70s	1.65 –1.70

ENGLISH SYSTEM KNITTING

2-20s, 44s in oil	$0.65
2-20s, 48s in oil	.70
2-20s, 50s in oil	.72½
2-20s, 56s in oil	.82½– .85
2-20s, 60s in oil	.95 – .97½
2-20s, 64s in oil	1.10 –1.12½
1-18s, 48s dyed	.85 – .87½
1-18s, 50s dyed	.90 – .92½

(Oil yarns 17½c. less)

FRENCH SYSTEM

1-20s, 58s	.90 – .95
1-20s, 60s	1.02½–1.05
1-18s, 64s, dyed	1.25 –1.27½
1-26s, 64s	1.02½–1.05
1-30s, 64s, Warp	1.10 –1.12½
2-30s, 64s, Fancy mixes	1.27½–1.32½
2-40s, 64s, Zephyrs	1.25 –1.27½
1-50s, 66s	1.35 –1.37½
2-50s, 66s	1.45 –1.47½
2-60s, 70s domestic	1.80 –1.85
1-60s, 70s, Australian	1.60 –1.70
2-60s, 70s, Australian	1.77½–1.87½

FRENCH SPUN MERINO WHITE

1-30s, 50-50-58s on cops	.90 – .92½
1-40s, 50-50-60s on cops	1.00 –1.02½
1-40s, 50-50-64s on cops	1.02½–1.05
1-40s, 50-50-64s Australian cops	1.10 –1.15

Underwear mixes, 3 to 5c., Solid color, 35c. additional.

New York Top Futures

	Closed Mar. 30	For Week—High	Low	Closed April 5	Net Ch'ge
April	61.50	62.00	61.50	61.50	.....
May	62.00	62.50	61.50	61.50	—0.50
June	62.00	62.00	61.50	61.50	—0.50
July	63.00	63.00	61.50	61.50	—1.50
August	62.00	63.00	61.50	61.50	—0.50
September	62.00	63.00	61.50	61.50	—0.50
October	62.50	62.60	62.00	62.00	—0.50
November	62.50	63.00	62.00	62.00	—0.50
December	63.00	64.60	62.00	62.00	—1.00
January	63.00	63.50	62.50	62.50	—0.50
February	63.00	63.50	62.50	62.50	—0.50
March	.....	.....	.....	62.50	.....

Tops and Noils

TOPS —BOSTON

Fine (64-66s)	$0.74 –0.75
Half-blood (60-62s)	.70 – .72
High ¾ blood (58s)	.62 – .64
Aver. ¾ blood (56s)	.57 – .58
Low ¾ blood	.54 – .57
High ½ blood (50s)	.50 – .52
46s S. A. and N. Z.	.52 – .54
44s S. A. and N. Z.	.48 – .50
40s S. A. and N. Z.	.45 – .47

TOPS — BRADFORD, ENG. (April 1)

Fine (70s)	24 d	¾ bld. (56s)	16½d
Fine (64s)	22 d	½ bld. (50s)	12 d
½ bld. (60s)	21 d	Cross-bred (46s)	9 d

NOILS — BOSTON

Fine	$0.38 –$0.40	High ½ bld.	$0.26 –$0.28
Half-bld	.32 – .35	Low noils	.20 – .23
Aver. ¾ bld.	.28 – .30	Medium colored	.18 – ,20
Fine colored	.23 – .28		

Wool Substitutes

WOOL WASTE

Lap, fine white	$0.57 – .59
Lap, fine colored	.40 – .43
Hard ends, fine white	.42 – .44
Hard ends, ¼ blood white	.28 – .31
Hard ends, fine colred	.18 – .20
Hard ends, medium colored	.13 – .15
Card, fine white	.23 – .25
Burr, fine carbonized	.24 – .26

OLD WOOLEN RAGS (GRADED FOR MFRS.)

Merinos, coarse light	$0.04½–0.05
Merinos, fine dark	.02½– .03
Merinos, fine light	.09 – .10
Serges, blue	.04½– .05
Serges, black	.04½– .05½
Serges, red	.07½– .08
Knit, white	.21 – .22
Knit, red	.08 – .08½
Knit, light hoods	.08½– .09½
Worsted, light	.03½– .04
Worsted, blue	.05 – .05½
Worsted, black	.05½– .06

Silk Yarns

THROWN SILK (60 day basis)
Prices Nominal

Japan organzine, 2 thd. spec. gd. XX sk 85%	$2.85
Japan organzine, 2 thd. grand sk. 83%	2.75
Japan organzine, 2 thd. sp. crack. sk. 81%	2.65
Japan crepe, 3 thd. gd. XX bob. 83%	2.50
Japan crepe, 3 thd. sp. crack. bob. 81%	2.40
Canton crepe, 3 and 4 thd. 14/16 on bobbins	2.20
Hosiery tram, 3 thd. Japan 90%	3 50
Hosiery tram 5 thd, Japan, 85%	2.60
Hosiery tram, crack XX 78%	2.25

SPUN SILK YARNS (Terms: net 30)

40/2	$3.10	60/2	$3.35
54/2	3.30	62/1	2.35

Raw Silk

(60 Day Terms. Spot Goods)
Prices Nominal

	13/15 White	20/22 White	20/22 Yellow
Super Grand, 87%	$1.95	$1.70	$1.75
Special Grand, 85%	1.85	1.60	1.65
Grand XX, 83%	1.75	1.55	1.60
Special Crack, 81%	1.65	1.50	1.55
Crack XX, 78%	1.60	1.45	1.50
Extra Extra, 73%	1.50	....	....
Best Extra, 68%	1.40	....	....

Canton filature, new style, 14/16	$1.35
Canton filature, new style, 20/22	1.25
Tussah filature, 8 cocoon	.95

NATIONAL RAW SILK EXCHANAE

	Close Mar. 30	For the Week High	Low	Close Apr. 5	Net Ch'ge
April	1.48	1.49	1.43	1.46	—0.02
May	1.48	1.48	1.43	1.45	—0.03
June	1.49	1.49	1.43	1.45	—0.04
July	1.49	1.50	1.43	1.46	—0.03
August	1.49	1.49	1.43	1.46	—0.03
September	1.49	1.51	1.43	1.46	—0.03
October	1.49	1.51	1.44	1.46	—0.03
November	1.49	1.50	1.44	1.46	—0.03

Total number of bales, 2,720. Total approximate value $560,728. Trading unit crack XX 13/15 white 78%.

Domestic Rayon

VISCOSE PROCESS

Denier	Filament	First	Second
30	8	$2.25	...
50	12–18	1.35	$1.25
75	18–30	1.20	1.10
100	18–40	1.00	.90
125	36–50	.90	.80
150	30	.72	.70
150	24–44	.75	.72
150	60	.85	.82
150	75–90	.85	.82
170	24–27	.75	.72
170	60	.85	.82
200	30–42	.75	.72
300	42–62	.63	.60
450	42–72	.63	.60
600	72–96	.63	.60
900	100–144	.63	.60

NITRO-CELLULOSE PROCESS

Denier	First Qual.	Second Qual.	Denier	First Qual.	Second Qual.
75	$1.35	$1.25	150	$0.75	$0 72
100	1.05	.95	175	.75	.72
125	.95	85			

CUPRAMMONIUM PROCESS

Denier	Filament	Price	Denier	Filament	Price
15	24	$3.10	75	60	$1.30
25	24	2.85	80	60	1.30
30	24	2.60	100	75	1.10
40	30	1.70	120	90	1.00
52	30	1.50	150	112	.90
65	45	1.40	180	135	.87

ACETATE PROCESS

Denier	Price	Denier	Price
45	$1.60	125	$1.10
60	1.50	150	1.00
75	1.40	300	1.00
100	1.30		

Rayon Waste

Open bleached waste	$0.13–$0.14
Open bleached waste	.10½
Bleached thread waste (mfs.)	.09
Bleached thread waste (misc.)	.06– .07
Colored thread waste	.03– .04
Colored clips	.03– .04

CONVERTED RAYON WASTE

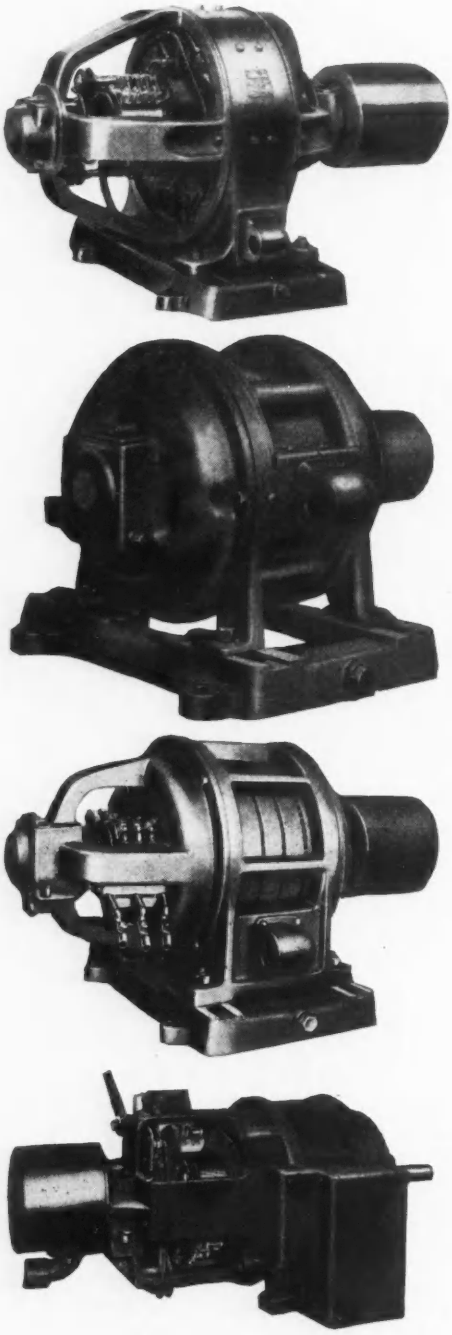
Bleached tops	$0.30–$0.32½
Unbleached tops	.27– .28
Bleached noils	.11
Unbleached noils	.09½
Bleached garnetts	.12
Unbleached garnetts	.13
Colored garnetts	.10– .11

Silk Waste

Kibizzo Kakai Grand XX	0.50
Kibizzo Kakai Triple Extra	.44
Frison Grand Double	.49
Pierced Cocoons	.50

"Which Motor Should I Purchase for My Knitting-Machine Drives?"

In answering that all important question, General Electric submits for your consideration four outstanding motors from an extensive line:



1. **DIRECT-CURRENT:** Offers distinct advantages of adjustable or constant speed with high operating economy for d-c. plants. Can be supplied with various types of enclosures as needed.

2. **SQUIRREL-CAGE INDUCTION:** Strong and well-balanced. Simplicity and outstanding performance make this motor a favorite. It can be furnished for either vertical or horizontal drive, and to fit individual applications.

3. **WOUND-ROTOR INDUCTION:** Possesses the inherent strength required for difficult drives, and provides the advantage of high torque with low starting current. Its adjustable-varying-speed characteristic makes it a low-cost solution to the problem of speed control.

4. **ADJUSTABLE-SPEED A-C. (Type BTA):** The a-c. motor with d-c. shunt motor characteristics. Speed control may be manual, remote, or automatic. It is a perfect drive for the man who demands the greatest refinements in speed control.

The nearest sales office of the General Electric Company will gladly answer questions concerning these motors, and others. Enlist the services of a G-E motor specialist in the solution of your power problems.

You are cordially invited to inspect the General Electric exhibit in booths 266 and 267, at the Knitting Arts Exhibition in the Commercial Museum, Philadelphia, Pa., April 11 to 15.

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